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Idaho Operations Office

Field Sampling Plan for Operable Unit 3-13, Group 4, Geochemical Study for Perched Water Source Identification

INEEL
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Idaho National Engineering and Environmental Laboratory

DOEAD-11100
Revision 0

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ABSTRACT

This Field Sampling Plan describes the sampling and the installation of monitoring equipment that will be conducted to determine sources of perched water in the northern part of the Idaho Nuclear Technology and Engineering Center. This Field Sampling Plan presents the rationale for determining sources of perched water. The sampling and monitoring locations for the geochemical study were selected to meet the data quality objectives detailed in this document Data obtained from this geochemical study will be used to determine sources of perched water and to determine the best means of reducing or eliminating the infiltration of water to the northern perched water zones.

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FIGURES

TABLES

ACRONYMS

bgs	below ground surface
BLR	Big Lost River
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	*Code ofFederal Regulations*
CoC	chain of custody
COC	contaminant of concern
CPP	Chemical Processing Plant
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
DOT	Department of Transportation
DQO	data quality objective
DR	decision rule
EPA	Environmental Protection Agency
ER	environmental restoration
ES&H	environmental safety and health
ES&H/QA	environmental safety and health/quality assurance
FFA/CO	Federal Facility Agreement and Consent Order
FSP	Field Sampling Plan
FTL	field team leader
FUM	facilities, utilities, and maintenance
HASP	Health and Safety Plan
HSO	health and safety officer
ID	identification
IDEQ	Idaho Department of Environmental Quality
IH	industrial hygienist
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center

JRC	job requirements checklist
JSS	job site supervisor
MSIP	Monitoring System Implementation Plan
MWTS	Monitoring Well and Tracer Study
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OU	operable unit
PM	project manager
PPE	personal protective equipment
PSQ	principal study question
QA	quality assurance
QA/QC	quality assurance/quality control
QAPjP	Quality Assurance Project Plan
RCT	radiological control technician
RD/RA	remedial design/remedial action
RG	Regulatory Guide
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
RPD	relative percent difference
RSD	relative standard deviation
S&H/QA	safety and health/quality assurance
SAM	Sample and Analysis Management
SAP	Sampling and Analysis Plan
SC	safety coordinator
SNF	spent nuclear fuel
SRPA	Snake River Plain Aquifer
TL	technical lead
USGS	United States Geological Survey
WAG	waste area group

WCF	Waste Calcining Facility
WMP	Waste Management Plan

Field Sampling Plan for Operable Unit 3-13, Group 4, Geochemical Study for Perched Water Source Identification

1. INTRODUCTION

The Idaho National Engineering and Environmental Laboratory (INEEL) is divided into 10 waste area groups (WAGs) to better manage environmental operations mandated under a Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991). The Idaho Nuclear Technology and Engineering Center (INTEC), formerly the Idaho Chemical Processing Plant (CPP), is designated as WAG 3. Operable Unit (OU) 3-13 encompasses the entire INTEC facility.

Operable Unit 3-13 was investigated to identify potential contaminant releases and exposure pathways to the environment from individual sites as well as the cumulative effects of related sites. Ninety-nine release sites were identified in the OU 3-13, Remedial Investigation/Feasibility Study (RI/FS), of which, 46 were shown to have a potential risk to human health or the environment (DOE-ID 1997). A new operable unit, OU 3-14, was created to specifically address activities at the tank farm area where special actions will be required. The 46 sites were divided into seven groups based on similar media, contaminants of concern (COCs), accessibility, or geographic proximity. The OU 3-13 Record of Decision (ROD) (DOE-ID 1999) identifies remedial design/remedial action (RD/RA) objectives for each of the seven groups. This Field Sampling Plan (FSP) is part of Group 4, Perched Water.

The Final ROD for OU 3-13 was signed in October 1999, and presents the selected remedial actions for the seven groups, including Group 4 perched water (DOE-ID 1999).

1.1 Project Purpose

The purpose of this FSP is to provide guidance for a geochemical study and downhole instrument installation designed to determine sources of perched water beneath the INTEC facility. Development of this FSP was based on the data gaps/needs identified in the Monitoring Well and Tracer Study (MWTS) Report (DOE-ID 2003a) and is needed to meet the requirements of the OU 3-13 ROD.

This FSP is one of the documents that composes the Group 4, Monitoring System Implementation Plan (MSIP). The MSIP contains the Group 4 project documentation and includes, in addition to this FSP, the Long Term Monitoring Plan (DOE-ID 2000), the Health and Safety Plan (HASP) (INEEL 2002), and the Waste Management Plan (WMP) (DOE-ID 2003b).

1.2 Scope

The goal of this FSP is to present a plan for determining the recharge sources of water responsible for perched water bodies in the northern part of INTEC. The need for this scope was identified in the Phase I MWTS Report (DOE-ID 2003a). This FSP includes sampling perched water wells at INTEC as well as collection of samples from potential perched water sources such as the sewage treatment lagoons, INTEC water supply, precipitation (snow), and steam discharge vents to determine sources of perched water in the northern part of INTEC. The scope of this project also includes the installation of downhole instrumentation to evaluate the hydrologic impact of the Big Lost River (BLR) on the perched water in the northern part of INTEC.

The data collected during the geochemical study will help to meet the following remediation goals set forth in the OU 3-13 ROD for the perched water: (1) “reduce recharge to the perched water” and (2) “minimize migration of contaminants to the (Snake River Plain Aquifer [SRPA]), so that SRPA groundwater outside of the current INTEC security fence meets the applicable State of Idaho groundwater standards by the year 2095” (DOE-ID 1999).

1.3 Regulatory Background

The OU 3-13 ROD identified remedies for the seven groupings with shared characteristics or common contaminant sources at INTEC, including Perched Water (Group 4). The remedial actions chosen in the ROD are in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act of CERCLA of 1986. In addition, the remedies comply with the National Oil and Hazardous Substances Pollution Contingency Plan (EPA 1990) and are intended to satisfy the requirements of the FFA/CO.

The DOE-ID is the lead agency for remedy decisions. The Environmental Protection Agency (EPA) Region 10 and the Idaho Department of Environmental Quality (IDEQ) approve these decisions

1.4 Document Organization

The organization of this FSP is as follows:

- Site description and background
- Field Sampling Plan objectives
- Field activities
- Perched water sampling procedures and equipment
- Sample control
- Quality assurance/quality control
- Project organization and responsibilities
- Waste management
- Health and safety
- Document management
- References.

2. SITE DESCRIPTION AND BACKGROUND

The INEEL is a **U.S.** Government-owned facility managed by the Department of Energy (DOE). The eastern boundary of the INEEL is located 52 km (32 mi) west of Idaho Falls, Idaho. The INEEL Site occupies approximately 2,305 km2 (890 mi^2) of the northwestern portion of the Eastern Snake River Plain in southeast Idaho. The INTEC facility covers an area of approximately 0.39 km^2 (0.15 mi^2), and is located approximately 72.5 km (45 mi) from Idaho Falls, in the south-central area of the INEEL as shown in Figure 2-1.

INTEC has been in operation since 1952. The plant's original mission was to reprocess uranium from defense related projects, and research and store spent nuclear fuel (SNF). The DOE phased out the reprocessing operations in 1992 and redirected the plant's mission to (1) receipt and temporary storage of SNF and other radioactive wastes for future disposition, (2) management of current and past wastes, and (3) performance of remedial actions.

The liquid waste generated from the past reprocessing activities is stored in an underground tank farm. The INTEC tank farm consists of eleven 1,135,624 L (300,000 gal) tanks, four 113,562 L (30,000 gal) tanks, four 68,137 L (18,000 gal) tanks, and associated equipment for the monitoring and control of waste transfers and tank parameters. One of the 1,135,624 L (300,000 gal) tanks serves as a spare tank and is always kept empty in the event of an emergency. The majority of wastes stored in the tank farm are raffinates generated during the first-, second-, and third-cycle fuel extraction processes. These wastes include high-level wastes that are composed of first- and second-cycle raffinates and intermediate level wastes that are composed of third-cycle raffinates blended with concentrated bottoms from the process equipment waste evaporator.

Numerous CERCLA sites are located in the area of the tank farm and adjacent to the process equipment waste evaporator. Contaminants found in the interstitial soils of the tank farm are the result of accidental releases and leaks from process piping, valve boxes, sumps, and cross-contamination from operations and maintenance excavations. No evidence has been found to indicate that the waste tanks themselves have leaked. The contaminated soils at the tank farm comprise about 95% of the known contaminant inventory at INTEC. The final comprehensive RI/FS for OU 3-13 (DOE-ID 1997) contains a complete discussion of the nature and extent of contamination.

The data collected during the Phase I MWTS Report confirmed that the northern and southern shallow perched water systems at the INTEC are separate hydrologic systems with different water sources (DOE-ID 2003a). Perched water is also differentiated by depth including a shallow perched water zone (approximately 33.5 to 42.7 m [110 to 140 ft] depth) and a deep perched water zone (approximately 115.8 m [380 ft] depth). The southern perched water zone was due primarily to the percolation ponds located at the southern end of INTEC. The ponds have received all plant service wastewater from the time that the injection well was discontinued in 1984 until the new percolation ponds were placed into service in August 2002. The northern perched water system appears more complex than the southern perched system. Geochemical data suggest that several sources of water contribute to the creation of the northern shallow and deep perched water systems. Based on water-level analysis, recharge from the BLR is very likely when it flows, but the recharge is difficult to quantify.

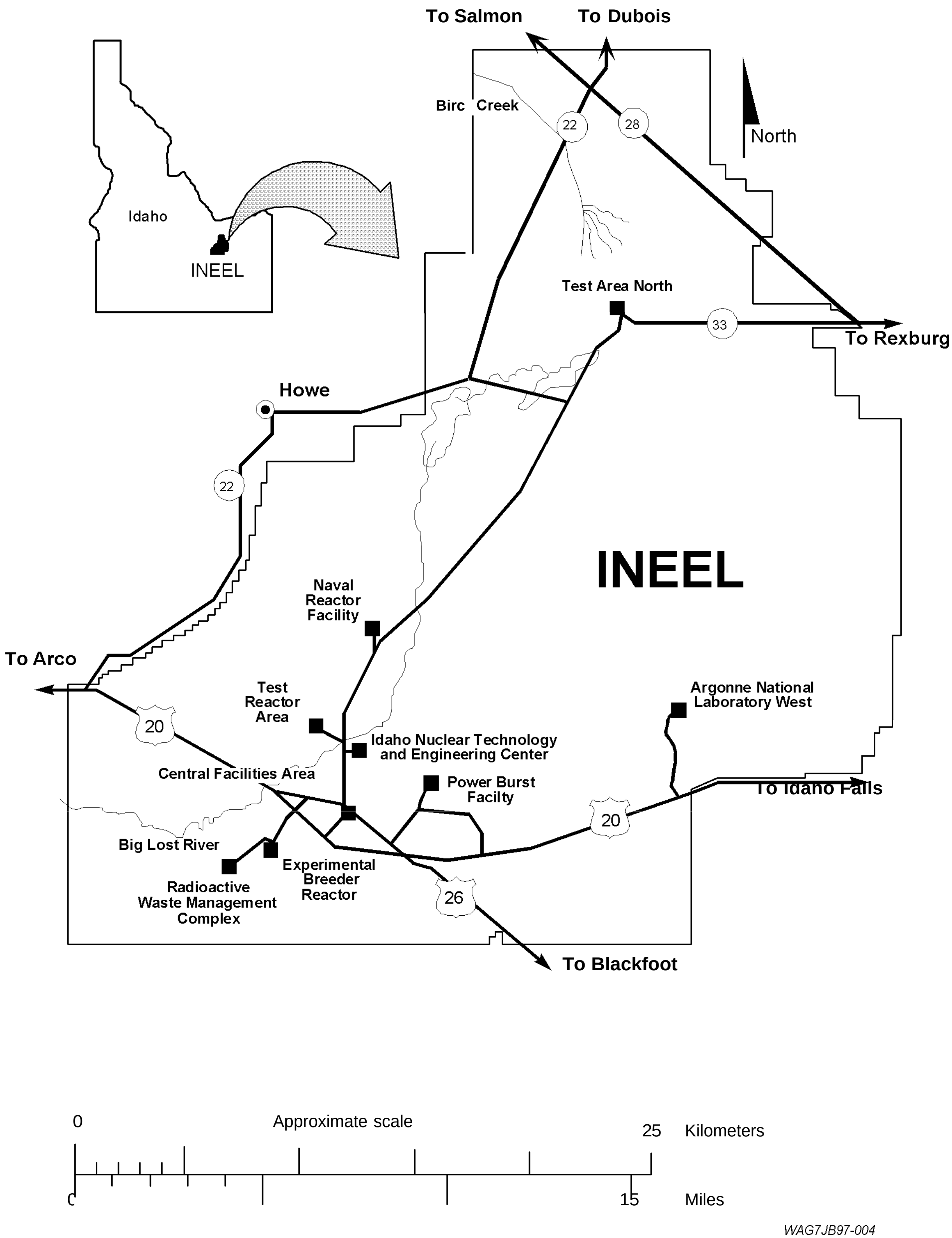

Figure 2-1. Map showing the location of the INTEC at the INEEL.

3. FIELD SAMPLING PLAN OBJECTIVES

The data quality objective (DQO) summary below is a modification of the original DQOs presented in the MSIP, Revision 0, in September 2000 (prior to Phase I well installations). The revised DQOs are based on a revised site conceptual model for vadose zone flow and transport beneath WAG 3 and recommendations in the Phase I MWTS Report (DOE-ID 2003a). The original form of the DQOs are retained in Revision 0 of the MSIP (DOE-ID 2000). For details on the final methodology and results of the Phase I activities, refer to the Phase I MWTS Report (DOE-ID 2003a).

The EPA developed the DQO process as a means to "improve the effectiveness, efficiency, and defensibility of decisions" used in the development of data collection designs (EPA 1994). The DQO process is a systematic procedure for defining data collection criteria based on the scientific method. This process consists of seven iterative steps that yield a set of principal study questions (PSQs) and decision statements that must be answered to address a primary problem statement. The seven steps of the DQO process are listed below:

- Step 1: State the problem
- Step 2: Identify the decision
- Step 3: Identify the inputs to the decision
- Step 4: Define the study boundaries
- Step 5: Develop decision rules (DRs)
- Step 6: Specify limits on the decision
- Step 7: Optimize the design for obtaining data

The revised DQO summary shown in Table 3-1 is based on the revised conceptual model for the perched water beneath INTEC. A discussion of the revised DQOs is included in the Group 4 MSIP.

Table 3-1. WAG-3, OU 3-13, Group 4, Perched Water, DQO table.

1. Problem Statement:	2. Principal Study Questions:	3. Inputs to the Decision:	4. Define the Study Boundaries
Is relocating the percolation ponds successful in meeting the OU 3-13, Group 4 remediation goals or are additional recharge controls necessary? Per the ROD (pp 9-5, DOE-ID 1999), additional infiltration controls may include lining the BLR, ceasing lawn irrigation, repairing leaking fire water lines, curtailing steam condensate discharges, and relocation of the sewage treatment lagoons if relocation of the percolation ponds is not successful in meeting the remediation goals. However, the MWTS Report (DOE-ID 2003a) indicated that other possible recharge sources (such as leaks from facility infrastructure, sewage treatment ponds, etc.) need to be evaluated for the northern part of INTEC.	PSQ 1a. Is the perched aquifer still predicted to continue under INTEC with removal of the percolation ponds?	The following are inputs to PSQ-la: 1. Results from site monitoring activities performed under PSQ-lb, and -2 below 2. Revision to WAG 3 RI/FS vadose zone numerical model incorporating updated site conceptual model information into an updated vadose zone model 3. An engineering study to quantify recharge sources as a result of operation losses and planned discharges of water from the INTEC water distribution system, steam condensate drains, and sewage treatment system, and other operational practices 4. An enhanced geochemical study of known recharge sources and the perched water bodies for stable isotopes, including nitrogen, to help in the identification of water sources contributing to perched water system.	This study focuses on the transport of COCs from the vadose zone to the SRPA. Specifically excluded from this study is contamination of the surface soils (alluvium to top of basalt) at INTEC, which are covered under other programs. Existing and any new information about contamination in the alluvium will be used as an input to the Group 4 modeling. The physical boundaries of the study area are from the BLR (on the north) to the percolation ponds at the south end of INTEC. The east-west boundaries roughly correspond to the east-west perched water zones and include the sewage treatment lagoons and probably a portion of the BLR. At depth, the boundaries of the study area are from the top of basalt down and into the top of the SRPA. The Group 4 remedial activities will also focus on identification of potential recharge sources for the northern perched water including the sewage treatment lagoons, leaks in facility infrastructure (water supply, fire, sewage lines, steam lines), lawn irrigation, and precipitation. The percolation ponds have been moved and the sewage treatment lagoons may be moved in the fall of 2003 (not part of the CERCLA remedial action). To aid in the remedial action evaluation and based on the physical characteristics of the perched water bodies and locations of recharge sources, the vadose zone will be divided into a northern-upper, northern-lower, southern-upper, and southern lower perched water zones. The boundary between north and south will be marked by an east-west line across the southern end of the FAST Building (CPP-666). The boundary between the upper and lower perched water is placed at a depth of 200 ft between what is commonly referred to as the upper interbeds (110-140 ft) and lower interbeds (–380 ft). The division of the vadose zone into four discrete study areas allows for independent review of each of these areas as the remedial action progresses. The Group 4 remedial activities will be undertaken in three phases. The purpose of the first phase was to obtain information and background data while the percolation ponds are workmg to establish compliance monitoring and Will include installation of 15 wells, conducting a series of tracer tests, and monitoring moisture content and COC concentrations. The Phase I results are described in the MWTS (DOE-ID 2003a). The purpose of Phase II is to monitor the drain out of the perched water following relocation of the percolation ponds, to perform water-balance and enhanced geochemical studies to determine sources of perched water, and may include drilling additional wells. Phase III activities, if required, Will be conducted to implement additional recharge controls (either lining of the BLR or other controls determined to be necessary) and long-term monitoring. Lining of the BLR will require preparation of additional CERCLA documentation (e.g., Work Plan), modification to the Scope of Work, and possibly, additional field investigations to support a Work Plan.
	PSQ 1b. Based on the revised WAG 3 vadose zone model and evaluation of other recharge sources, has the COC flux to the SRPA been reduced following the percolation pond relocation such that water quality in the SRPA will meet applicable standards by 2095.	The following are inputs to PSQ-lb: 1. Spatially distributed matric potential measurements from tensiometers (to measure soil tension) installed withm each of the subsurface zones at INTEC 2. WAG 3 revised vadose zone numerical model derived matric potential action levels for each of the same subsurface zones 3. Moisture characteristic curves for interbed sediments 4. Collection and chemical analysis for COCs of perched water samples from existing vadose zone monitoring wells 5. Collection and chemical analysis for COC of water samples from new and existing lysimeters 6. Measurement of water levels in existing vadose zone monitoring wells 7. Collection and chemical analysis for COC of groundwater samples from new and existing monitoring wells installed in the SRPA 8. Measurement of water levels in new and existing monitoring wells installed in the SRPA 9. Recharge water source information for precipitation, BLR flows, and facility discharge volumes 10 Incorporation of monitoring data, collected during the 5 years following relocation of the percolation pond, into an updated WAG 3, OU 3-13 model and calculation of the predicted concentrations of COCs in the SRPA in year 2095 and beyond. 11 Prediction of COC concentrations in the SRPA through 2095 and beyond 12. Risk predictions based on results of updated vadose zone model.	
	PSQ-2. Based upon new data obtained during the evaluation of the percolation pond relocation and other recharge sources, is lining of the BLR the recommended alternative if additional recharge controls are necessary?	The following are inputs to PSQ-2 may include the following: 1. Inputs established under PSQ-la and b, above 2. Monitoring flow in the BLR [United States Geological Survey (USGS) data] 3. Installing monitoring equipment in perched wells near the BLR.	

Table 3-1. (continued).

5. Develop a Decision Rule	6. Specify Tolerable Limits on Decision Errors	7. Optimize the Design
DR-la: If, the updated site conceptual/numerical model based on Phase I and Phase II results, including the enhanced geochemical study and the engineering-waterbalance study, indicates that concentrations of COCs in the SRPA will be equal to or less than applicable MCLs or Regulatory Guides (RGs) in the year 2095 and beyond, then we can conclude that we have met the first remediation goal for Group 4. If we conclude that either of the remediation goals, DR-la or DR-lb, has not been met, then the remedial action objective has not been met and per the OU 3-13 ROD, additional infiltration controls must be implemented. DR-lb: If, following 5 years of monitoring, and incorporation of those data into the refined WAG-3, OU 3-13 model, modeling concentrations of COCs in the SRPA are predicted to be equal to or less than applicable MCLs or RGs in the year 2095 and beyond, then we can conclude that we have met the second remediation goal for Group 4. If we conclude that either of the remediation goals, DR-la or DR-lb, has not been met, then the remedial action objective has not been met and per the OU 3-13 ROD, additional infiltration controls must be implemented.	The primary remedial action decisions that Will be arrived at under the Group 4 remedy will be based on results of numerical modeling that predict groundwater concentrations in the SRPA in 2095 and beyond. As such, the decisions Will be based on estimated values for which specific error limits cannot be defined in a manner similar to traditional tolerance limits applied to laboratory analytical results. The accuracy of the computer predictions will be evaluated by comparing model predications to observed concentrations.	The design for the WAG-3 OU 3-13 Group 4 investigation will be implemented in phases. The proposed Phase I activities were described in a previous revision of the MSIP. A description of the completed Phase I activities is given in the MWTS Report (DOE-ID 2003a). Phase II activities will include routine groundwater sampling and monitoring, an enhanced geochemical study and an engineering study of the INTEC water systems to evaluate potential sources of perched water recharge. The Phase II enhanced geochemical study will include sample collection from potential water sources such as the sewage plant effluent, ponded surface water in the spring, snow, water supply, steam condensate discharge, and fire line water and monitoring wells in the northern part of INTEC. The enhanced geochemical sampling program is a 1-year program designed to monitor the influence from various potential sources of perched water. Samples from the potential water sources will be analyzed for major cation and anions and for oxygen and hydrogen isotopic composition. Up to three steam condensate samples will be collected from discharge conduits located near the tank farm. The steam conduits to be sampled will be guided by the results of the engineering study described below. Up to three ponded surface water samples, if available, will be collected in the spring to evaluate the chemical signature of potential surface water infiltration. Up to three snow samples will be collected in late February or March prior to spring snow melt and analyzed for oxygen and hydrogen isotopic ratios. The water supply, sewage plant effluent and fire line water Will be sampled quarterly for one year. The samples from the sewage treatment plant Will be collected from the infiltration ponds. The water supply will be sampled after chlorination. Note that the sewage infiltration pond sampling may not occur if the sewage infiltration ponds are taken off-line prior initiation of this sampling program. The enhanced geochemical study will include sampling wells near the tank farm up to four times over a period of one year for hydrogen and oxygen isotopic analysis, major cations, anions, and key radiological analytes including tritium and strontium-90. The wells in this geochemical study include 55-06, MW-5, MW-2, MW-20-2, MW-10-2, 37-4, MW-24, MW-1-4, USGS-50, 33-2, 33-3, and 33-4. The total number of samples Will be determined by the probability of a significant spring infiltration event and whether there is flow in the BLR. If the BLR flows and if water-levels rise in the perched wells near the tank farm, a sampling event will occur to characterize the influence from the BLR on perched water chemistry and will analyze for anions, cations, tritium, and strontium-90. Wells in northern part of INTEC will be instrumented with water-level, conductivity, and temperature probes to evaluate impacts from the BLR. Wells planned to be instrumented for evaluation of the impacts of the BLR will include TF-AL, TF-DP, TF-CH, BLR-AL, BLR-SP, BLR-DP, BLR-CH, 33-2, 33-3, 33-4, 37-4, MW-24, MW-1-4, MW-10-2, MW-5, and MW-2. When the BLR flows, up to six samples will be collected from the BLR for hydrogen and oxygen isotopic and geochemical characterization including major anions and cations to characterize seasonal variation in the composition of the BLR. This data, in combination with water-level and conductivity data will be used to evaluate the impact of the BLR on perched wells in the northern part of INTEC. Hydrogen and oxygen isotopic data Will only be collected if the BLR is flowing during the period that other potential perched water sources are sampled for oxygen and hydrogen isotopic composition. If the BLR does not flow in Spring 2004, hydrogen and oxygen isotopic data Will not be collected and wells will only be sampled for anions, cations, tritium, and strontium-90. One sampling event will occur after the BLR has been flowing for a period time. The wells to be sampled to evaluate the influence of the BLR include 55-06, MW-5, MW-2, MW-20, MW-10, 37-4, MW-4-2, MW-24, MW-1, USGS-50, STL-DP, BLR-DP, BLR-CH, BLR-AL, 33-2, 33-3, and 33-4. A sampling event for nitrogen and oxygen isotope ratios in nitrate for perched wells 55-06, MW-5, MW-2, MW-20-2, MW-10-2, 37-4, MW-4-2, MW-24, MW-1-4, USGS-50, STL-DP, CS-CH, 33-2, 33-3, and 33-4 will be conducted to evaluate the sources of elevated nitrate concentrations in the shallow and deep perched water wells in the northern part of INTEC. Potential nitrate sources include the sewage treatment lagoons and industrial source(s) such as the tank farm. Because nitrate concentrations are higher downgradient of WTEC than upgradient in the SRPA, samples should be collected from wells USGS-121, USGS-47, USGS-112, USGS-77, USGS-123, USGS-52, and ICPP-MON-A-230 to evaluate potential impacts on the SRPA from perched water and contaminant flux from the tank farm area or the sewage treatment lagoons. The engineering study to quantify recharge sources Will consist of two phases. The first phase will include (a) reviewing historical information (such as previous tracer studies to evaluate line leaks), (b) identify new, existing, modified, and projected input and output water sources, (c) develop and recommend the methods for quantifying discharges, recharges, and flow rates from point sources and nonpoint sources, and (d) make recommendations for minimizing recharge to perched water bodies in and surrounding INTEC. The engineering study will update and expand upon the ICPP Water Inventory Study Project Summary Report (WINCO 1994). The engineering study will prepare a water balance for fire and raw water systems, potable and demineralized water systems, steam condensate systems and sanitary sewer and service waste systems, landscaping systems, drains, basins, sewers, and other outlets. Since steam condensate systems may only be active during part of the year, the analysis of the steam condensate discharge and line losses may have to be performed at a different time of year from the other water systems. The initial phase of the engineering study will evaluate steam uses. Maps showing locations of water leaks or losses Will be prepared. Recommendations for minimizing perched water recharge Will also be made. The second phase of the engineering study will be to evaluate and implement recommendations from the phase one report. A meeting will be held with the Agencies to discuss and concur on the Phase II scope. If the above described data are inconclusive, on recharge sources, then Phase II may also include installing additional well sets which may include an alluvial well (–45 ft below ground surface [bgs]), a shallow perched water well (–120 to 140 ft bgs), a deep perched water well (–380 ft bgs), and an aquifer skimmer well (-450 ft bgs). Phase II may also include monitoring instrumentation installed in Phase I and II wells, monitoring water levels in all existing perched water wells, and COC and geochemical sampling of soil- and perched-water in new and existing wells. Except for the one year enhanced geochemistry study, COCs including any additional hazardous substances Will be sampled for annually during Phase I and II until the decision on the need for further recharge control is made (sometime after the 5 years following the relocation of the percolation ponds). Thereafter, they will be sampled for in 5-yr increments. Except for the one year enhanced geochemistry study, geochemistry samples Will be collected initially (after completion of Phase I wells) and in years 2, 4, and 6 (percolation ponds were relocated in year 2). Yearly sampling and monitoring the vadose zone wells will continue after the enhanced geochemical study during the 5 years following percolation pond removal. It is estimated that a network of about 60 wells will be sampled, if water is present, annually for chemical analysis. Moisture data from the same well network Will be collected daily during this part of the investigation. After the 5 years, monitoring and sampling will continue in a reduced well network (–20 wells) at a reduced frequency. Phase II will also include collecting soil moisture tension data from the Phase I perched water wells, collecting water samples from newly installed instrumentation as well as existing perched water wells and analyzing data for COCs and water geochemistry. COC analytes may include tritium, technicium-99, iodine-129, strontium-90, plutonium and uranium isotopes, mercury, and other hazardous constituents in addition to the COCs listed in the ROD (DOE-ID 1999). Phase III will be initiated only if additional recharge controls are implemented. Phase III may include additional recharge controls and long term monitoring.

4. FIELD ACTIVITIES

The following sections describe the field activities and procedures to be used to meet the DQOs described in Section 3. Prior to commencing any sampling activities, a prejob briefing will be held with all work-site personnel to review the requirements of the FSP, HASP, and other work control documentation, and to verify that all supporting documentation has been completed. Additionally, at the termination of the sampling and instrument installation activities, a postjob review will be conducted. Both prejob and postjob briefings will be conducted in accordance with applicable procedures. The field team leader (FTL) (and other project personnel) will need to ensure that the fieldwork is being performed using the most current and applicable procedures.

The geochemical study of recharge sources will focus on identifying the sources of perched water in the northern part of INTEC near the tank farm. This will require the collection and analysis of potential water sources (such as drinking water, raw water, sewage treatment lagoons, BLR, and steam discharge) and perched water from the monitoring well network. The analyte list will be used to characterize the chemistry of recharge sources and to trace the water in a perched well to an individual recharge source, if possible.

4.1 Nitrogen Isotope Study

The goals of the nitrogen isotope study are (1) to identify the nitrogen contributions of the sewage treatment plant and tank farm to shallow and deep perched wells in the northern part of INTEC and (2) identify the source of elevated nitrate concentrations in the SWA downgradient of the INTEC. Potential nitrate sources include the sewage treatment lagoons and industrial source(s) such as nitric acid from the tank farm. To accomplish the goals, both perched water and aquifer wells have been selected for sampling and analysis of nitrogen stable isotope ratios ($\delta^{15}N$). Nitric acid derived from atmospheric N_2 should have a $\delta^{15}N$ near zero, whereas nitrate in sewage typically has $\delta^{15}N$ values of 8 to 20 per mil. In addition, the $\delta^{18}O$ of nitrate will also be determined. The $\delta^{18}O$ of nitrate can be used in combination with $\delta^{15}N$ data to better determine the source of the nitrate. Nitrate used in acids, such as from the tank farm, would derive oxygen from the atmosphere with a $\delta^{18}O$ of +23.5 per mil (Amberger and Schmidt 1987). The nitrate formed from the oxidation of reduced nitrogen species in sewage derives two of its three oxygen atoms from the local water and one from air (Clark and Fritz 1997). The local precipitation is -17 to -18 per mil $\delta^{18}O$ (USGS 1999; DOE-ID 2003a).

A limited sampling event for nitrogen and oxygen isotope ratios in nitrate will occur in September 03 for perched wells 55-06, MW-1-4, United States Geological Survey (USGS)-50, MW-2, MW-5, 37-4, and MW-24. This sampling event will occur while the sewage treatment lagoons are still in operation. An extended sampling event for nitrogen and oxygen isotope ratios in nitrate for perched wells 55-06, MW-5, MW-2, MW-20-2, MW-10-2, 37-4, MW-4-2, MW-24, MW-1-4, USGS-50, STL-DP, CS-CH, 33-2, 33-3, and 33-4 will be conducted to evaluate the sources of elevated nitrate concentrations in the shallow and deep perched water wells in the northern part of INTEC in 2004 (Figure 4-1). Groundwater samples will be collected from SWA wells USGS-121, USGS-47, USGS-112, USGS-77, USGS-123, USGS-52, and ICPP-MON-A-230 to evaluate potential impacts on the SWA from perched water and contaminant flux from the tank farm area or the sewage treatment lagoons.

4.2 Sampling Locations and Laboratory Analytes

The goal of the geochemical study is to characterize the various water sources (sewage lagoons, drinking water supply, steam discharge, precipitation, and fire water/raw water) in terms of major cation and anion chemistry, and oxygen and hydrogen isotope characteristics to identify their contribution to the perched water near the tank farm. The chemical signatures of the various water sources will be used to determine their impact on the perched water.

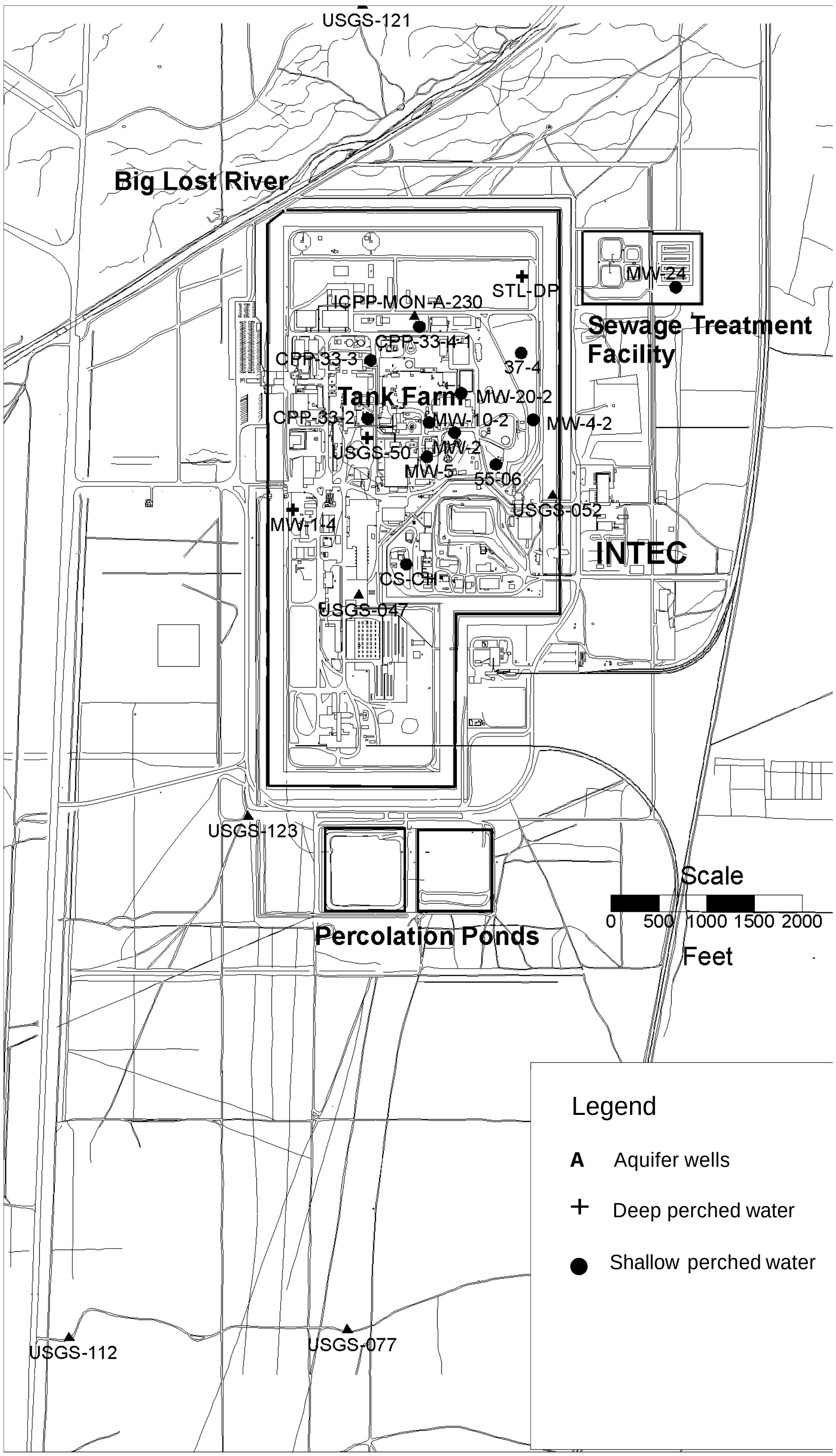

Figure 4-1. Map of INTEC showing proposed sampling locations for the nitrogen isotope study in 2004.

The geochemical study will include sample collection from potential water sources such as the sewage plant effluent, ponded surface water in the spring, snow, water supply, steam condensate discharge, and fire line water and monitoring wells in the northern part of INTEC. The geochemical study is a 1-year sampling program designed to monitor the influence from various potential sources of perched water. Samples from the potential water sources will be analyzed for major cations and anions and for oxygen and hydrogen isotopic composition. Up to three steam condensate samples will be collected from discharge conduits located near the tank farm. The steam conduits to be sampled will be guided by the results of the engineering study described in the MSIP and on Table 3-1. Up to three ponded surface water samples, if available, will be collected in the spring to evaluate the chemical an isotopic signature of potential surface water infiltration. Up to three snow samples will be collected in late February or March prior to spring snow melt and analyzed for oxygen and hydrogen isotopic ratios. The water supply, sewage plant effluent and fire line water will be sampled quarterly for 1 year. The samples from the sewage treatment plant will be collected from the infiltration ponds. The water supply will be sampled after chlorination. Note that the sewage infiltration pond sampling may not occur if the sewage infiltration ponds are taken off-line prior initiation of this sampling program. The source water samples and list of analytes are summarized in Table 4-1.

The geochemical study will include sampling wells near the tank farm up to four times over a period of approximately one year for hydrogen and oxygen isotopic analysis, metals and major cations (filtered), anions, and key radiological analytes including tritium and strontium-90 (Table 4-1). The wells to be sampled in this geochemical study include 55-06, MW-5, MW-2, MW-20-2, MW-10-2, 37-4, MW-24, MW-1-4, USGS-50, 33-2, 33-3, and 33-4 (Figure 4-2). The total number of sampling events will be determined by the probability of a significant spring infiltration event and whether there is flow in the BLR. If the BLR flows and if water-levels rise in the perched wells near the tank farm, a geochemical study sampling event and the BLR sampling event will be combined to characterize the influence from the BLR on perched water chemistry and will analyze for anions, metals/cations (filtered), tritium, and strontium-90. Samples for metals/cations will be filtered so that the data are comparable.

Table 4-1. Summary of analytes for source water and geochemical sampling.

	Metals/ Cations[a]	Anions[b]	$\delta^{18}O$ and δD of water	$\delta^{15}N$ and $\delta^{18}O$ of nitrate	Tritium & Strontium
Source water sampling					
Water supply	X	X	X	—	—
Sewage lagoons	X	X	X	—	—
Fire/raw water	X	X	X	X	—
Steam condensate	X	X	X	—	—
BLR	X	X	X	—	—
Ponded water	X	X	X	—	—
Snow	—	—	X	—	—
Monitoring well sampling					
Geochemical study	X	X	X	—	X
BLR sampling	X	X	X	—	X
Nitrate/oxygen isotope study	—	—	—	X	—

a. Metals/cations includes the list of 23 metals + boron.

b. Anions includes chloride, sulfate, fluoride, bromide, nitrate, and alkalinity.

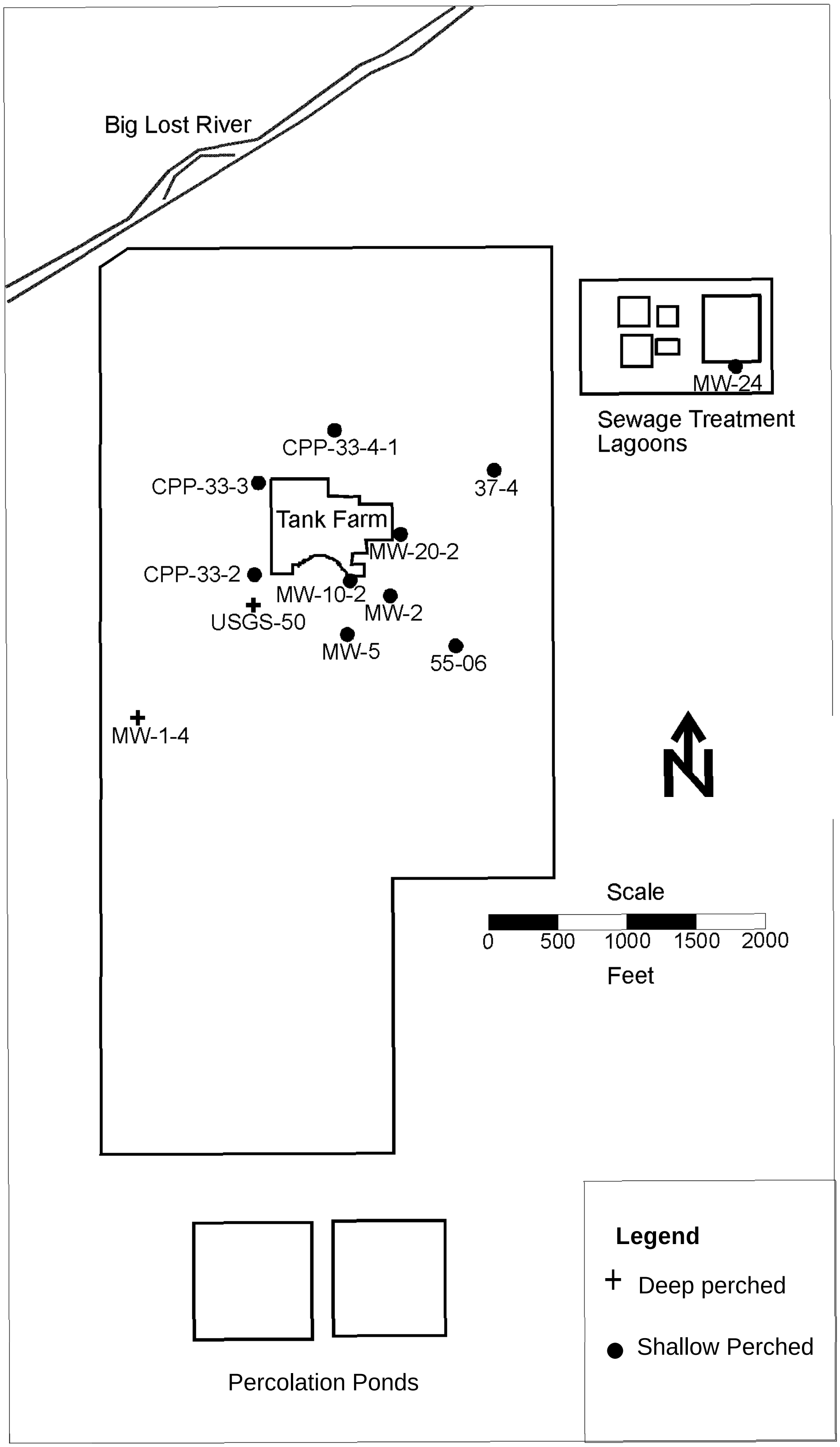

Figure 4-2. Map of INTEC showing proposed perched water sampling locations for the geochemcial source water characterization.

If the BLR flows before October 2004, up to six samples will be collected from the BLR for hydrogen and oxygen isotopic and geochemical characterization including major anions and metals/cations to characterize variation in the composition of the BLR. These data, in combination with water-level and conductivity data will be used to evaluate the impact of the BLR on perched wells in the northern part of INTEC. Hydrogen and oxygen isotopic data will only be collected if the BLR is flowing during the period that other potential perched water sources are sampled for oxygen and hydrogen isotopic composition. With only one sampling event and a limited run of the river, the data may not be conclusive regarding the areal extent of the BLR on the perched aquifers.

If the BLR does not flow in Spring 2004, hydrogen and oxygen isotopic data will not be collected and wells will only be sampled for anions, metals/cations (filtered), tritium, and strontium-90. If the BLR does not flow by October 2005, the BLR sampling will not occur because the data would not be able to be incorporated into the Group 4 vadoze zone model. If the BLR flow is turbid, samples for metals/cations will be filtered. One sampling event will occur after the BLR has been flowing for a period time and water levels rise in the perched wells near the tank farm so that the effects of the BLR may be more easily discerned. The wells to be sampled to evaluate the influence of the BLR include 55-06, MW-5, MW-2, MW-20, MW-10, 37-4, MW-4, MW-24, MW-1, USGS-50, STL-DP, BLR-DP, BLR-CH, BLR-AL, 33-2, 33-3, and 33-4 (Figure 4-3).

4.3 Well Instrumentation

Sixteen wells in the northern part of INTEC are planned to be instrumented with temperature, electrical conductivity, and water-level probes. The conductivity data will be used to evaluate the influence of the BLR on the perched water in the northern part of INTEC by examining the change in electrical conductivity of the wells versus changes in water-level. The BLR has an average specific conductance of 340 μmhos/cm and a range of 250 to 420 μmhos/cm for the period from 1984 to 1998 (USGS 2002) while the perched wells in the northern part of INTEC have conductivity values of approximately 800 μmhos/cm range. The USGS monitors the flow and conductivity of the BLR at the Lincoln Blvd Bridge.

Wells in the northern part of INTEC that are planned to be instrumented with probes to measure water-level, conductivity, and temperature to evaluate impacts from the BLR will include TF-AL, TF-DP, TF-CH, BLR-AL, BLR-SP, BLR-DP, BLR-CH, STL-DP, 33-2, 33-3, 33-4, 37-4, MW-24, MW-1-4, MW-10-2, MW-5, and MW-2 (Figure 4-4). The ability to instrument these wells assumes that the water-level, conductivity, and temperature probe will fit down these wells. The Waste Calcining Facility (WCF) sampling may interfere with the water-level analysis for the wells in the vicinity of the WCF.

4.4 Sampling Schedule

The tentative schedule for proposed sampling events is in Table 4-2. The sampling for some source waters, such as snow and surface runoff ponding, is scheduled for the February–March time period. The exact timing of this sampling will depend on the weather conditions. The sampling schedule assumes that the BLR starts to flow in May 04. If the river does not flow, the BLR sampling will not occur in 2004. If the BLR does not flow in 2005, the BLR sampling event will be cancelled since the data would not be available for revision of the Group 4 vadose zone model.

Some sampling events will be combined, if possible. The annual groundwater sampling scheduled for February and March 2004 will be combined with a geochemical study sampling event. The BLR and geochemical study sampling scheduled for June–July of 2004 will be combined into a single sampling event if the BLR flows. If the BLR does not flow in 2004, the geochemical study sampling will still occur but the BLR sampling event will be rescheduled to 2005. The geochemical sampling event scheduled

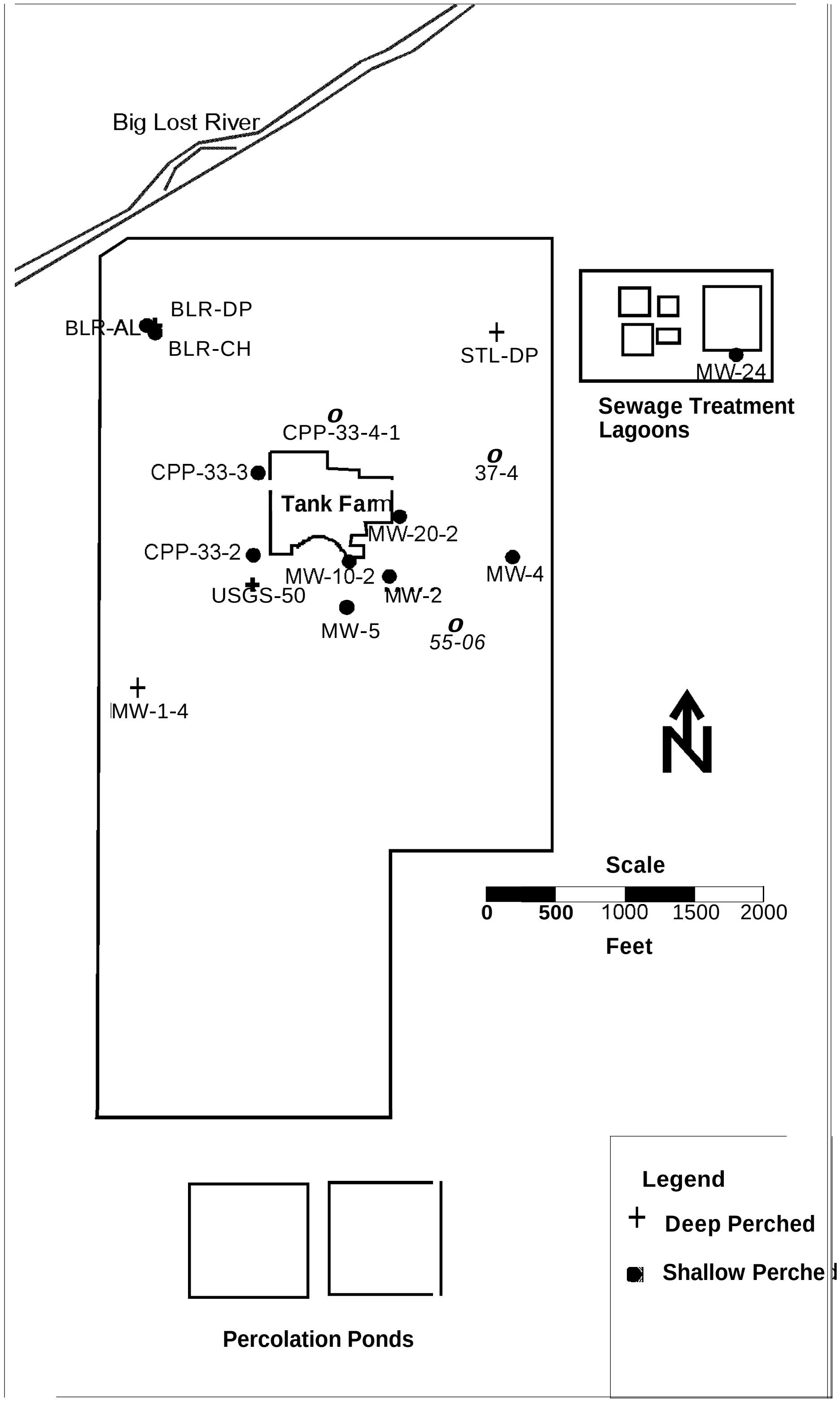

Figure 4-3. Map of INTEC showing proposed perched water wells for monitoring the influence of the BLR.

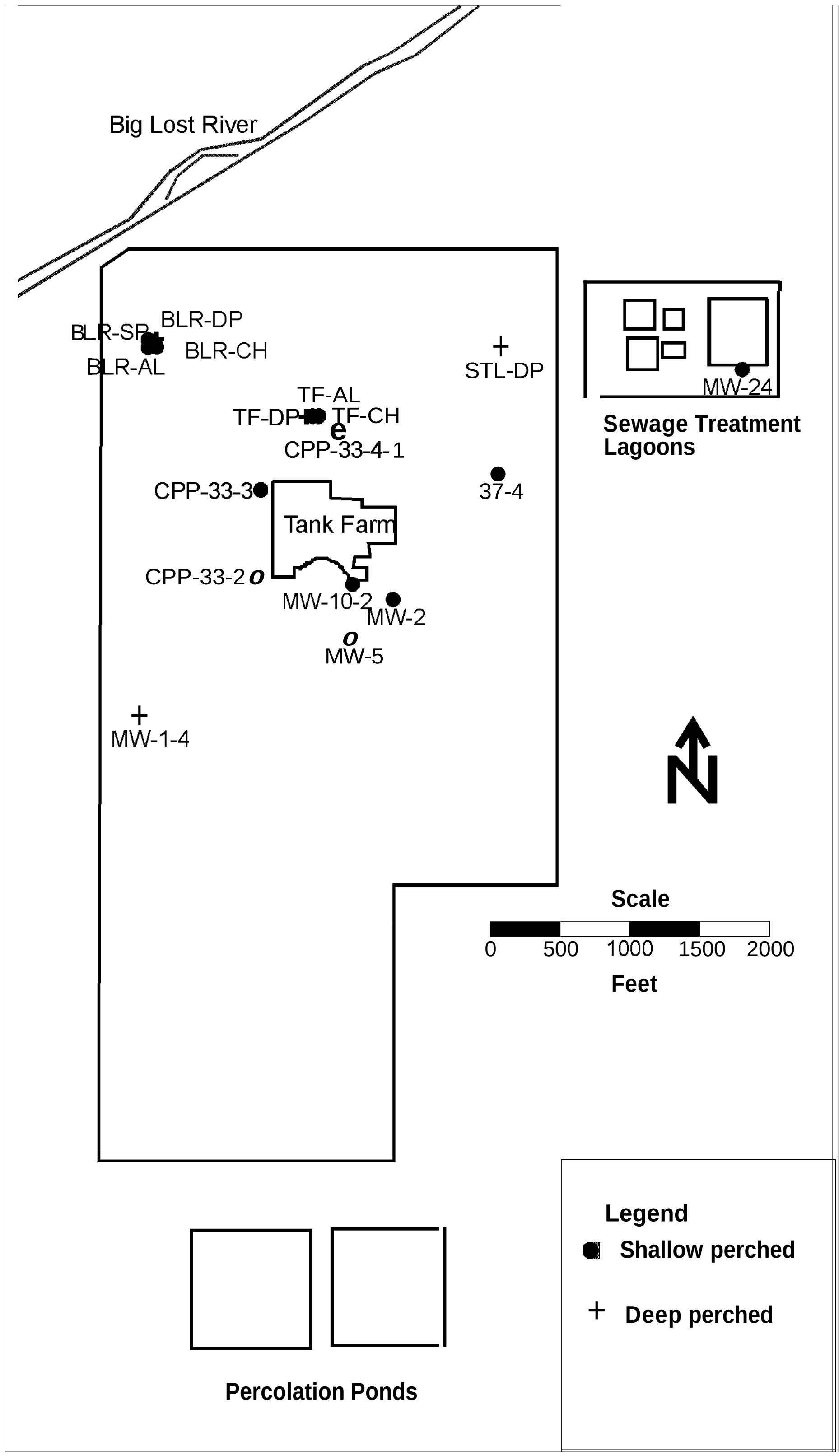

Figure 4-4. Map of INTEC showing proposed perched water wells for monitoring water-level, conductivity, and temperature.

October–November 2004 will occur, if needed. The need for this event will be based upon preliminary review of existing data. A limited nitrogen isotope study is scheduled for September 2003 with an extended study scheduled for February–April 2004 to coincide with the Groups 4 and 5 annual sampling events. Nitrogen and oxygen isotopic data for nitrate will be collected from MW-24, 55-06, 37-4, MW-1-4, MW-5, USGS-50, and MW-2 and the effluent to the sewage treatment lagoons in September 2003 because the sewage treatment lagoons may be moved prior to extended nitrogen isotope study in February–April 2004.

4.5 Sampling Quality Assurance/Quality Control

Section 6 of this FSP and the Quality Assurance Project Plan (QAPjP) (DOE-ID 2002) requires quality assurance/quality control (QA/QC) samples from the aquifer and perched groundwater sampling. Laboratories approved by the Sample and Analysis Management (SAM) will be used for the analyses of all such samples. QA/QC samples will be collected at the frequency recommended in the QAPjP but not less than one set per well set.

QA/QC samples for the perched wells include rinsate samples and duplicates. If additional sample volume is available, duplicate samples will be collected at a frequency of 1 per 20 samples.

4.6 Corrective Actions

In the event a discrepancy is discovered by field personnel or auditors, some form of corrective action will be initiated. The level of action taken is related to the level of the discrepancy. Corrective actions can range from field changes due to unforeseen field conditions to DOE reportable incidents. All corrective actions will be addressed following applicable company policies and procedures.

Table 4-2. Schedule for sampling.

	2003						2004										
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November
Source Water Sampling																	
Water supply	—	—	X	—	—	X	—	X	—	—	—	—	X	—	—	—	—
Sewage lagoons	—	—	X	—	—	X	—	X	—	—	—	—	X	—	—	—	—
Fire/raw water	—	—	X	—	—	X	—	X	—	—	—	—	X	—	—	—	—
Steam condensate	—	—	—	—	—	X	—	----------X--------		—	—	—	—	—	—	—	—
BLR	—	—	—	—	—	—	—	—	—	—	X	X	X	X	X	X	—
Ponded water	—	—	—	—	—	—	—	----------X--------		—	—	—	—	—	—	—	—
Snow	—	—	—	—	—	—	—	----------X--------		—	—	—	—	—	—	—	—
Monitoring Well Sampling																	
Geochemical study	—	—	X	—	—	—	—	----------X--------		—	—	------X------		—	—	----------X------------	
Annual well sampling”	—	—	—	—	—	—	—	----------X--------		—	—	—	—	—	—	—	—
BLR[b]	—	—	—	—	—	—	—	—	—	—	—	------X-----		—	—	—	—
Nitrogen/oxygen isotope[c]	—	—	X	—	—	—	—	-------------X-------------			—	—	—	—	—	—	—

a. The geochemical sampling and annual well sampling scheduled for February and March will be combined into a single sampling event.

b. The BLR and geochemical sampling event scheduled for July 2004 will be combined into a single sampling event if the BLR flows.

c. A limited study will occur in September and an extended study will occur in February–April 2004, during the Group 4 and Group 5 annual well sampling events.

5. PERCHED WATER SAMPLING PROCEDURES AND EQUIPMENT

This section describes the sampling and monitoring procedures and equipment to be used for the planned perched water sampling for the geochemical study, BLR sampling event, and nitrate study. Prior to the commencement of any sampling activities, a presampling meeting will be held to review the requirements of this FSP, the HASP (INEEL 2002), applicable company policies and procedures, and to ensure all supporting documentation has been completed. Figures 4-1 through 4-4 identify the wells *anticipated* to be sampled as part of the geochemical study and BLR sampling event.

Due to the potential difficulties of sampling perched water, a sufficient volume of sample may not be available to meet all of the analytical needs. For this reason the available sample volume will be allocated to meet the project needs. The prioritization of analytical needs is specified in Section 5.3.

5.1 Perched Water Elevations

Prior to sampling, all perched water elevations will be measured using either an electronic measuring tape (Solinst brand or equivalent) or a steel type measure as described in the latest INEEL standard operating procedure. Measurement of all perched water levels will be recorded to the nearest 0.01 ft.

5.2 Well Purging

All perched water wells that have sufficient water will be purged prior to sample collection. During the purging operation, a Hydrolab (or equivalent) will be used to measure specific conductance, pH, and temperature. The pH, temp, and specific conductance readings will be compiled from the logbooks and used in the geochemical analysis. Well-purging will follow the latest INEEL procedure. A sample for water quality analysis can be collected after a minimum of three well casing volumes of water have been purged from the well and when three consecutive water quality parameters are within the following limits:

- pH $\pm$ 0.1
- Temperature $\pm$ 0.5°C
- Specific conductance $\pm$ 10 μmhos/cm.

The perched water formation surrounding some of the wells may be inadequate to supply the three well casing volumes of water. In that case, the well should be purged to dryness and allowed to recover sufficiently to permit sampling. At that point, samples should be collected.

5.3 Perched Water Sampling

Prior to sampling, all nondedicated sampling equipment that comes in contact with the water sample will be cleaned following the latest INEEL procedure for decontamination of field sampling equipment. Following sampling, all nondedicated equipment that came in contact with the well water will be decontaminated prior to storage per the latest INEEL procedure.

Prior to purging, the water level in each well will be measured. The well will then be purged a minimum of three well-casing volumes until the pH, temperature, and specific conductance of the purge water have stabilized, or until a maximum of four well-casing volumes have been removed. If the well goes dry prior to purging three wellbore volumes, purging will be considered complete and samples collected thereafter. If parameters are still not stable after four volumes have been removed, samples will be collected and appropriate notations will be recorded in the logbook.

Perched water samples will be collected for the analyses defined in Table 4-1. The requirements for containers, preservation methods, sample volumes, holding times, and analytical methods will be in the laboratory Statement of Work to be prepared prior to sampling.

Sample bottles for perched water samples will be filled to approximately 90 to 95% of capacity to allow for content expansion or preservation. Samples to be analyzed for metals (TAL metals plus boron) will be filtered through a 0.45 μm filter. Samples requiring acidification will be acidified to a pH <2 using ultrapure nitric acid. The preferred order for sample collection is as follows:

- Temperature, pH, specific conductance, and dissolved oxygen (during purging)
- Nitrogen and oxygen isotopic ratios in nitrate (filtered)
- Oxygen and hydrogen stable isotope ratios (unfiltered)
- Anions (except alkalinity, unfiltered)
- Metals/cations (filtered)
- Radionuclides (unfiltered)
- Alkalinity.

5.4 Suction Lysimeter Sampling

Suction lysimeters are dedicated equipment that are buried in the subsurface. Therefore, they are not cleaned prior to sampling. Field chemistry data are not usually collected because sample volumes may be limited. The lysimeter sampling will follow the latest company procedure. If there is sufficient sample volume, the sample water will be analyzed for the same chemical suite as perched water (Table 4-1). If there is limited water, the analyte priority will be determined at the time of sampling.

5.5 Personal Protective Equipment

The personal protective equipment (PPE) required for this sampling effort is discussed in the project HASP. Prior to disposal, all PPE will be characterized based on perched water and field screening results, and a hazardous waste determination will be made as per the requirements set forth in applicable company policies and procedures.

6. SAMPLE CONTROL

Strict sample control is required of any project. Sample control assures that unique sample identifiers are used for separate samples. It also covers the documentation of sample collection information so that a sampling event may be reconstructed at a later date. The following sections detail unique sample designation, sample handling, including shipping, and radiological screening of samples.

6.1 Sample Designation

A systematic identification code is crucial for the unique identification of samples. Uniqueness is required for maintaining consistency within a project and preventing the same identification code from being assigned to more than one sample.

6.1.1 Sample Identification Code

A systematic character identification (ID) code will be used to uniquely identify all samples. Uniqueness is required to maintain consistency and prevent the same ID code from being assigned to more than one sample. The first three designators of the code (PWM) indicate that the sample originated from perched water monitoring activities. The next three numbers designate the sequential sample number for the project. The seventh and eighth characters represent a two-character set (e.g., 01, 02) for designation of field duplicate samples. The last two characters refer to a particular analysis and bottle type. Refer to the Sampling and Analysis Plan (SAP) tables in Appendix A for specific bottle code designations.

For example, a perched water sample collected in support of the post-ROD monitoring might be designated as SWG00101LL where (from left to right)

- SWG designates the sample as being collected for geochemical study
- 001 designates the sequential sample number
- 01 designates the type of sample (01 = original, 02 = field duplicate)
- LL designates filtered metals analysis.

A SAP table/database will be used to record all pertinent information (well designation, media, date, etc.) associated with each sample ID code. The SAP tables for Phase I WAG *3* post-ROD sampling are presented in Appendix A.

6.1.2 Sampling and Analysis Plan Table/Database

6.1.2.1 General. A SAP table format was developed to simplify the presentation of the sampling scheme for project personnel. The following sections describe the information recorded in the SAP table/database, which is presented in Appendix A.

6.1.2.2 Sample Description Fields. The sample description fields contain information relating individual sample characteristics.

- Sampling Activity—The sampling activity field contains the first six characters of the assigned sample number. The sample number in its entirety will be used to link information from other sources (field data, analytical data, etc.) to the information in the SAP table for data reporting, sample tracking, and completeness reporting. The sample number will also be used by the analytical laboratory to track and report analytical results.

- Sample *Type*—Data in this field will be selected from the following:
  - REG — For a regular sample
  - QC — For a QC sample.
- Media—Data in this field will be selected from the following:
  - PERCHED WATER — For water collected from the perched water zones
  - WATER — For regular and QA/QC samples of pore, perched, or groundwater.
- Collection *Type*—Data in this field will be selected from the following:
  - GRAB — For grab samples (undisturbed and disturbed core sample)
  - FBLK — For field blanks
  - RNST — For rinsates
  - DUP — For duplicates.
- Sampling Method—Data in this field are related to what the sample is taken from. For example, LYS designates a suction lysimeter sample. This field may be left blank.

6.1.2.3 Planned Date. This date is related to the planned sample collection start date.

6.1.2.4 Sample Location Fields. This group of fields pinpoints the exact location for the sample in three-dimensional space, starting with the general area, narrowing the focus to an exact location geographically, and then specifying the depth in the depth field.

- Area—The area field identifies the general sample collection area. This field should contain the standard identifier for the INEEL area being sampled. For this investigation, samples are being collected from sites designated as the WAG 3 perched water. The area field identifier will correspond to these two sites.

- Location—This field generally contains program specific information such as borehole or well identification number, but may contain geographical coordinates, x-y coordinates, building numbers, or other location identifying details. Data in this field will normally be subordinate to the area. This information is included on the labels generated by the SAM to aid field sampling personnel.

- Type *of* Location—The type of location field supplies descriptive information concerning the exact sample location. Information in this field may overlap that in the location field but it is intended to add detail to the location.

- Depth—The depth of a sample location is the distance in feet from ground surface or a range in feet from the surface.

6.7.2.5 Analysis Types

- A***T1–AT20***—These fields indicate analysis types (radiological, chemical, etc.) and the number to be collected for each sample number. Space is provided at the bottom of the form to clearly identify each type. A standard abbreviation is also provided for each analysis below the AT cell.

6.2 Sample Handling

Analytical samples for laboratory analyses will be collected in precleaned containers and packaged according to American Society for Testing and Materials, or EPA-recommended procedures. The QA samples will be included to satisfy the QA/QC requirements for the field operation as outlined in the QAPjP (DOE-ID 2002). Qualified (SAM approved) analytical and testing laboratories will analyze the samples.

6.2.1 Sample Preservation

All perched water, rinsate, and QA/QC samples will be placed in coolers containing frozen, reusable ice packs or ice immediately after sample collection and survey by the radiological control technician (RCT). Samples requiring cooling, will be maintained at 4°C (39°F) for preservation immediately after sample collection through sample shipment as required. After preservation sample bottles will have chain-of-custody (CoC) seals attached.

6.2.2 Chain-of-Custody Procedures

The CoC procedures will be followed per applicable company procedures and the QAPjP (DOE-ID 2002). Sample containers will be stored in a secured area accessible only to the field team members.

6.2.3 Transportation of Samples

Samples will be shipped in accordance with the regulations issued by the Department of Transportation (DOT) (49 CFR Parts 171 through 178) and EPA sample handling, packaging, and shipping methods (40 CFR 261.3). Samples will be packaged in accordance with the requirements set forth in applicable company policies and procedures.

6.2.3.1 Custody Seals. Custody seals will be placed on all shipping containers in such a way as to ensure that tampering or unauthorized opening does not compromise sample integrity. Clear plastic tape will be placed over the seals to ensure that the seals are not damaged during shipment.

6.2.3.2 On-Site and Off-Site Shipping. An on-Site shipment is any transfer of material within the perimeter of the INEEL. Site-specific requirements for transporting samples within INEEL boundaries and those required by the shipping and receiving department will be followed. Shipment within the INEEL boundaries will conform to DOT requirements as stated in 49 CFR. Off-Site sample shipment will be coordinated with Packaging and Transportation personnel, as necessary, and will conform to all applicable DOT requirements.

6.3 Radiological Screening

Following sample collection, samples will be surveyed for external contamination and field screened for radiation levels. If necessary, a gamma screening sample will be collected and submitted to either the INTEC Analytical Laboratory or the Radiation Measurements Laboratory, located at TRA-620, for a 20-minute analysis prior to shipment off-Site. Determination of the need for radiological screening will be made by the RCT in the field.

If it is determined that the contact readings on the samples exceed 200 mR/hour beta/gamma, then the samples will be held for analysis in the INTEC Remote Analytical Laboratory.

7. QUALITY ASSURANCE/QUALITY CONTROL

A QAPjP has been developed for WAGs 1, 2, 3, 4, 5, 6, 7, 10, and the Inactive Sites Department (DOE-ID 2002). This QAPjP pertains to all environmental, and radiological testing, analysis, and data review. This section details the field elements of the QAPjP to support field operations during the implementation of this FSP.

7.1 Project Quality Objectives

QA objectives specify what measurements must be met to produce acceptable data for a project. The technical and statistical qualities of those measurements must be properly documented. Precision, accuracy, and completeness are quantitative parameters that must be specified for physical/chemical measurements. Comparability and representativeness are qualitative parameters.

QA objectives for this project will be met through a combination of field and laboratory checks. Field checks will consist of collecting field duplicates, equipment blanks, and field blanks. Laboratory checks consist of initial and continuing calibration samples, laboratory control samples, matrix spikes, and matrix spike duplicates. Laboratory QA is detailed in the QAPjP (DOE-ID 2002) and is beyond the scope of this FSP.

7.1.1 Field Precision

Field precision is a measure of the variability not due to laboratory or analytical methods. The three types of field variability or heterogeneity are spatially within a data population, between individual samples, and within an individual sample. Although the heterogeneity between and within samples can be evaluated using duplicate and/or sample splits, overall field precision will be calculated as the relative percent difference (RPD) between two measurements or relative standard deviation (RSD) between three or more measurements. The RPD or RSD will be calculated as indicated in the QAPjP (DOE-ID 2002), for duplicate samples during the data validation process. Precision goals have been established for inorganic Contract Laboratory Program methods by the EPA (EPA 1993) and for radiological analyses in the applicable SAM procedures.

Duplicate samples to assess precision will be co-located and collected by field personnel at a minimum frequency of one duplicate for every 20 samples or one duplicate sample per well set, whichever is less, with the location of the QA/QC samples being rotation between sampling events so that each new well will have at least one QA/QC sample before the end of Phase II. These duplicates will be collected for water (blanks) matrix. Sample identifications are provided in the SAP table presented in Appendix A. SAP tables and QA/QC sampling for the longer-term sampling are in the Long Term Monitoring Plan (DOE-ID 2000).

7.1.2 Field Accuracy

Cross contamination of the samples during collection or shipping could yield incorrect analytical results. To assess the occurrence of any cross contamination events, equipment blanks, and field blanks will be collected to evaluate any potential impacts. The goal of the sampling program is to eliminate any cross contamination associated with sample collection or shipping. Analytical results for these samples will be evaluated during the data validation process by sample delivery group. If necessary, the data will be blank-qualified to indicate the presence of cross contamination.

Field personnel will collect rinsate, equipment, and field blanks during the course of the project. The rinsate, equipment, and field blanks will be collected at a frequency of one every 20 samples or once for every sample day, which ever is less (DOE-ID 2002). If activities that could contaminate the samples are identified during sampling, additional blank samples may be collected at the discretion of the Field Team Leader. Sample identifications are provided in the SAP tables presented in Appendix A.

7.1.3 Representativeness

Representativeness is evaluated by assessing the accuracy and precision of the sampling program and expressing the degree to which samples represent actual site conditions. In essence, representativeness is a qualitative parameter that addresses whether the sampling program was properly designed to meet the DQOs. The representativeness criterion is best satisfied by confirming that a sufficient number of samples are collected to meet the requirements stated in the DQOs. The DQOs are identified in Section 3 of this FSP.

7.1.4 Comparability

Comparability is a qualitative measure of the confidence with which one data set can be compared to another. These data sets include data generated by different laboratories performing this work, data generated by laboratories in previous studies, data generated by the same laboratory over a period of several years, or data obtained using differing sampling techniques or analytical protocols. For field aspects of this program, data comparability will be achieved using standard methods of sample collection and handling. Procedures identified to standardize the sample collection and handling are included in applicable company policies and procedures

7.1.5 Completeness

Field completeness will be assessed by comparing the number of samples collected to the number of samples planned. Field sampling completeness is affected by such factors as equipment and instrument malfunctions and insufficient sample recovery. Completeness can be assessed following data validation and reduction. The completeness goal for this project is 90%.

7.2 Data Validation

All laboratory generated data, except for stable isotope data, will be validated to Level A. Data validation will be performed in accordance with applicable company procedures. Field generated data (e.g., conductivity, temperature, dissolved oxygen, and pH) will be validated through the use of properly calibrated instrumentation, comparing and cross checking data with independently gathered data, and recording data collection activities in a bound field logbook.

7.3 QA Objectives for Measurement

The QA objectives are specifications that the monitoring and sampling measurements—identified in the QAPjP (DOE-ID 2002)—must meet to produce acceptable data for the project. The technical and statistical quality of these measurements must be properly documented. Precision, accuracy, method detection limits, and completeness must be specified for chemical measurements. Specific QA objectives are specified in the QAPjP for WAGs 1, 2, 3, 4, 5, 6, 7, 10, and inactive sites (DOE-ID 2002).

8. PROJECT ORGANIZATION AND RESPONSIBILITIES

The organizational structure for this project reflects the resources and expertise required to perform the work, while minimizing the risks to worker health and safety. As outlined in the FFA/CO each of the three signatory agencies (DOE, EPA, IDEQ) has assigned a WAG project manager (PM). The WAG PM's responsibility is to oversee the effective implementation of actions stated in final action documents (i.e., the OU 3-13 ROD). This section is divided into two subsections that outline the responsibilities of key Bechtel BWXT Idaho, LLC work-site personnel only. Section 8.1 discusses key personnel who will be directly associated with the job site (i.e., onsite personnel). Section 8.2 discusses those positions that will supply support for the activities in the field but are not required to be onsite.

8.1 Job-Site Personnel

The tasks and responsibilities of job-site personnel are described in the following sections

8.1.1 Project Manager

The PM coordinates all document preparation, field, laboratory, and modeling activities associated with this project and is responsible for the overall scope, schedule, and budget of this project. The PM shall ensure that all activities conducted during the project comply with the following:

- INTEC site director requirements as outlined in the CERCLA applicable or relevant and appropriate requirements and associated company policies and procedures

- All applicable Occupational Safety and Health Administration (OSHA), EPA, DOE, DOT, and State of Idaho requirements as specified in the ROD applicable or relevant and appropriate requirements

- The QAPjP (DOE-ID 2002), the project HASP, the project WMP, and this FSP.

The PM will oversee preparation, review, and implementation of this FSP to ensure work is performed as planned. The PM is responsible for (1) developing resource loaded, time-phased control account plans based on the project technical requirements, budgets, and schedules and (2) assigning project tasks. Other hnctions and responsibilities of the PM related to completion of field activities include the following:

- Developing the site-specific plans required by the Environmental Restoration (ER) Program such as Work Plans, environmental safety and health (ES&H) plans, SAPs, etc.

- Ensuring that project activities and deliverables meet schedule and scope requirements as described in the FFA/CO Attachment A, "Action Plan for Implementation of the Federal Facility Agreement and Consent Order" (DOE-ID 1991) and applicable guidance

- Coordinating and interfacing with units within the program support organization on issues relating to QA and ES&H support for the project

- Coordinating the site-specific data collection, review for technical adequacy, and data input to an approved database such as the Environmental Restoration Information System

- Coordinating and interfacing with subcontractors to ensure milestones are met, adequate management support is in place, technical scope is planned and executed appropriately, and project costs are kept within budget.

8.1.2 Technical Lead

The technical lead (TL) is assigned by the PM to provide technical expertise and oversees the preparation, review, and implementation of the FSP to ensure work is technically correct. The TL works with the PM to ensure that

- Site-specific plans required by the ER program such as Work Plans, ES&H plans, SAPs, etc., are prepared

- Activities and deliverables meet schedule and scope requirements as described in the FFA/CO Attachment A, "Action Plan for Implementation of the Federal Facility Agreement and Consent Order," (DOE-ID 1991) and applicable guidance

- Resolves issues relating to QA and ES&H support for the project.

The TL may function as the FTL at the job site. The TL is the primary contact for any questions related to the various work tasks associated with this project.

8.1.3 Field Team Leader

The FTL represents the ER organization at the job site with delegated responsibility for the safe and successful completion of the project. The FTL works with the PM to manage field sampling operations, and execution of the Work Plan. The FTL enforces work-site control, documents activities, and may conduct the daily safety briefings at the start of the shift. Health and safety issues must be brought to the attention of the FTL.

If the FTL leaves the job site, an alternate individual will be appointed to act as the FTL. Persons who act as the FTL on the job site must meet all the FTL training requirements as outlined in the project HASP. The identity of the acting FTL shall be conveyed to work-site personnel, recorded in the FTL logbook, and communicated to the INTEC director or designee, when appropriate.

The FTL shall comply with the requirements outlined in applicable company policies and procedures by completing the briefings and reviews, and submitting the documentation to the INTEC site director. The FTL shall complete the job requirements checklist (JRC) as per applicable company policies and procedures.

The FTL shall be responsible for ensuring compliance with waste management requirements and coordinate such activities with the environmental compliance coordinator and/or designee.

8.1.4 Health and Safety Officer

The health and safety officer (HSO) is the person located at the work site who serves as the primary contact for health and safety issues. The HSO shall assist the FTL on all aspects of health and safety (which includes complying with the enhanced work planning process) and is authorized to stop work at the work site if any operation threatens worker or public health and/or safety. The HSO may be assigned other responsibilities, as stated in other sections of the project HASP (INEEL 2002), as long as they do not interfere with the primary responsibilities stated here. The HSO is authorized to verify compliance to the HASP, conduct inspections, monitor decontamination procedures, and require and monitor corrective actions, as appropriate. Other ES&H professionals at the work site (safety coordinator [SC], industrial hygienist [IH], RCT, radiological engineer, environmental compliance coordinator, and facility representative[s]), may support the HSO, as necessary.

Persons assigned as the HSO, or alternate HSO, must be qualified (per the OSHA definition) to recognize and evaluate hazards, and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO may also be the IH, SC, or in some cases the FTL (depending on the hazards, complexity and size of the activity involved, and required concurrence from the ER ES&H/QA manager) at the work site, other task-site responsibilities of the HSO must not conflict (philosophically or in terms of significant added volume of work) with the role of the HSO at the work site.

If it is necessary for the HSO to leave the work site, an alternate individual will be appointed by the HSO to fulfill this role. The identity of the acting HSO will be recorded in the FTL logbook and work-site personnel will be notified.

8.1.5 Industrial Hygienist

The assigned IH is the primary source for information regarding nonradiological hazardous and toxic agents at the task site. The IH shall assist the FTL in completing the JRC and assess the potential for worker exposures to hazardous agents according to the contractor manual, applicable company policies and procedures, and accepted industry IH practices and protocol. By participating in work-site characterization, the IH assesses and recommends appropriate hazard controls for the protection of work-site personnel, operates and maintains airborne sampling and monitoring equipment, reviews for effectiveness, and recommends and assesses the use of PPE required in the project HASP (recommending changes as appropriate).

Following an evacuation, the IH, in conjunction with other recovery team members, will assist the FTL in determining whether conditions exist for safe work-site reentry as described in the project HASP. Personnel showing health effects (signs and symptoms) resulting from possible exposure to hazardous agents will be referred to an Occupational Medical Program physician by the IH, their supervisor, or the HSO. The IH may have other duties at the work site, as specified in the project HASP, and/or applicable company policies and procedures. During emergencies involving hazardous materials, airborne sampling and monitoring results will be coordinated with members of the Emergency Response Organization.

8.1.6 Radiological Control Technician

The assigned RCT is the primary source for information and guidance on radiological hazards. The RCT will be present at the job site during any work operations when a radiological hazard to personnel may exist or is anticipated. The RCT shall also assist the FTL in completing the JRC. Responsibilities of the RCT include radiological surveying of the work site, equipment, and samples; providing guidance for radioactive decontamination of equipment and personnel; and accompanying the affected personnel to the nearest INEEL medical facility for evaluation if significant radiological contamination occurs. The RCT must notify the FTL of any radiological occurrence that must be reported as directed by company manuals. The RCT may have other duties at the job site as specified in the project HASP and/or applicable company policies and procedures.

8.1.7 Job Site Supervisor

The job site supervisor **(JSS)** serves as the representative for the Facilities, Utilities, and Maintenance (FUM) Department, and the Site Services Branch at the task site. The **JSS** is the supervisor of crafts and other FUM personnel assigned to work at the job site. The **JSS** is the interface between FUM and ER, and works closely with the FTL at the work site to ensure that the objectives of the project are accomplished in a safe and efficient manner. The **JSS** and FTL work as a team to accomplish day-to-day operations at the job site, identify and obtain additional resources needed at the job site, and interact with the HSO, IH, SC, RCT, and/or radiological engineer on matters regarding health and safety. The **JSS,** like the FTL, must be informed about any health and safety issues that arise at the work site and may stop work at the job site if an unsafe condition exists. The **JSS** also shares the FTL's responsibility for daily prejob briefings.

8.1.8 Sampling Team

The sampling team will perform the onsite tasks necessary to collect, package, and ship samples. Tasks may include the physical collection of sample material, completion of CoC and shipping request forms, and proper packaging of samples in accepted shipping containers (properly labeled and sealed coolers). The size and makeup of the sampling team will be dependent on the extent of the sampling task. The IH and RCT will support the sampling team when sampling is performed inside the contamination area. The sampling team may be lead by the FTL or a designated sample team lead.

8.1.9 Work-Site Personnel

All work-site personnel shall understand and comply with the requirements of the project HASP. The FTL or **JSS** will brief work-site personnel at the start of each shift. During the prejob briefing all daily tasks, associated hazards, engineering and administrative controls, required PPE, work control documents, and emergency conditions and actions will be discussed. Input from the project HSO, IH, and RCT, and/or radiological engineer to clarify task health and safety requirements will be provided. All personnel are encouraged to ask questions regarding site tasks and provide suggestions on ways to perform required tasks in a more safe and effective manner based on the lessons learned from previous days' activities.

Once at the job site, personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL, **JSS,** or HSO for corrective action. [a]

8.2 Supporting Personnel

The tasks and responsibilities of support personnel are described in the following sections.

8.2.1 INTEC Site Director

The INTEC site director has the authority and responsibility to ensure proper ownership review of all activity within the INTEC facility, all work processes, and work packages including, but not limited to, the following:

- Establishing and executing monthly, weekly, and daily operating plans

[a] All work-site personnel are authorized to stop work immediately if they perceive that an unsafe condition poses an imminent danger. They must then notify the FTL, JSS, or HSO of the unsafe condition.

- Executing the INTEC ES&H/QA program
- Executing the Integrated Safety Management System for INTEC
- Executing the enhanced work planning for INTEC
- Executing the Voluntary Protection Program in the area
- All environmental compliance within the area
- Executing that portion of the voluntary compliance order that pertains to the area
- Correcting the root cause functions of the accident investigation in the area
- Correcting the root cause functions of the voluntary compliance order for the area.

8.2.2 INTEC Safety and Health/Quality Assurance Manager

The INTEC safety and health/quality assurance (S&H/QA) manager or designee is responsible for ensuring that ES&H oversight is provided for WAG *3* ER projects performed at or adjacent to the INTEC facility. This position reports to and is accountable to the INTEC site director. The INTEC S&H/QA manager performs line management review, inspections, and oversight in compliance with applicable company policies and procedures. Project or program management shall bring all S&H/QA concerns, questions, comments, and disputes that cannot be resolved by the HSO or one of the assigned ES&H professionals to the ER S&H/QA manager or to the INTEC S&H/QA manager.

8.2.3 Safety Coordinator

The assigned SC reviews work packages, periodically observes work-site activity, assesses compliance with the contractor manual, signs safe work permits, advises the FTL on required safety equipment, answers questions on safety issues and concerns, and recommends solutions to safety issues and concerns that arise at the work site. The SC shall assist the FTL in completing the JRC. The SC may have other duties at the work site as specified in the project HASP and/or applicable company policies and procedures. The fire protection engineer's function is included under the SC designation and is the person assigned to review work packages and perform field assessments for fire protection controls.

8.2.4 Radiological Engineer

The radiological engineer is the primary source for information and guidance relative to the evaluation and control of radioactive hazards at the work site. If a radiological hazard exists or occurs at the job site, the radiological engineer makes recommendations to minimize health and safety risks to work-site personnel. Responsibilities of the radiological engineer include the following: (1) performing radiation exposure estimates and as low as reasonably achievable evaluations, (2) identifying the type(s) of radiological monitoring equipment necessary for the work, *(3)* advising the FTL and RCT of changes in monitoring or PPE, and (4) advising personnel on work-site evacuation and reentry. The radiological engineer may have to perform evaluations specified in applicable company policies and procedures for release of materials with inaccessible surfaces. The radiological engineer may also have other duties to perform as specified in the project HASP or in company manuals.

8.2.5 Sample and Analysis Management

The INEEL SAM has the responsibility of obtaining necessary laboratory services as required to meet the needs of this project. They will also ensure that data generated from samples meet the needs of the project by validating all analytical laboratory data to resident protocol, and ensuring that data are reported to the project in a timely fashion as required by the FFA/CO.

The SAM-contracted laboratory will have overall responsibility for laboratory technical quality, laboratory cost control, laboratory personnel management, and adherence to agreed-upon laboratory schedules. Responsibilities of the laboratory personnel include preparing analytical reports, ensuring CoC information is complete, and ensuring all QA/QC procedures are implemented in accordance with SAM generated task order Statements of Work and master task agreements.

8.2.6 Integrated Environmental Data Management System Technical Leader

The Integrated Environmental Data Management System technical leader will interface with the PM during the preparation of the SAP database. This individual also provides guidance on the appropriate number of field quality control samples required by the QAPjP (DOE-ID 2002). The numbers used by the project are unique from all others ever assigned by Integrated Environmental Data Management System. The preparation of the plan database, along with completion of the SAM request services form, initiates the sample and sample waste tracking activities performed by the SAM.

8.2.7 Waste Generator Services

Waste Generator Services personnel provide support to the project in the area of waste segregation, storage, and disposal. For this project a Waste Generator Services engineer will be assigned to take care of all waste generated from the tasks conducted for this project.

8.2.8 Occasional Workers

All persons who may be on the project work site, but are not part of the field team, are considered occasional workers for the purposes of this project (e.g., surveyor or other crafts personnel not assigned to the project). A person shall be considered "onsite" when they are present in or beyond the designated support zone. Occasional workers per 29 CFR 1910.120 and 29 CFR 1926.65, and must meet minimum training requirements for such workers as described in the OSHA standards and any additional site-specific training as identified in the project HASP.

All occasional workers, including contractor and subcontractor employees who are not working on the project, or nonessential representatives of DOE and/or state or federal regulatory agencies, may not proceed beyond the support zone without receiving job-specific HASP training, signing a job-specific HASP training acknowledgement form, receiving a full safety briefing, wearing the appropriate PPE, and providing proof of meeting the minimum training requirements specified in the project HASP. A fully trained job-site representative (such as the FTL, **JSS,** HSO, or a designated alternate) will escort occasional workers at all times while on the task site.

8.2.9 Visitors

All visitors with official business at the project task site, including contractor and subcontractor personnel, representatives of DOE, and/or state or federal regulatory agencies, may not proceed beyond the support zone without receiving project-specific HASP training, signing a HASP training acknowledgement form, receiving a full safety briefing, wearing the appropriate PPE, and providing proof of meeting the minimum training requirements as specified in the project HASP. A fully trained job-site representative (such as the FTL, **JSS,** or HSO, or a designated alternate) will escort visitors at all times while at the work site.

A casual visitor to the work site is a person who does not have a specific task to perform or other official business to conduct at the work site.[b]

[b] Casual visitors are not permitted at the job site(s) for the Group 4, perched water sampling

9. WASTE MANAGEMENT

This section is intended to briefly summarize the project specific Waste Management Plan (DOE-ID 2003b) and to familiarize field personnel with the various wastes to be encountered on the job site. For a full discussion of the waste management for this project, see "Waste Management Plan for Operable Unit 3-13, Group 4 Perched Water" (DOE-ID 2003b). Remediation waste generated during the OU 3-13, Group 4 perched geochemical study may include the following:

- Contaminated personal protective equipment, wipes, bags, and other refuse
- Well purge water
- Aqueous decontamination solutions
- Used sample containers and disposable sampling equipment.

10. HEALTH AND SAFETY

A project-specific HASP (INEEL 2002) has been prepared to define the health and safety requirements for this project. This HASP establishes the procedures and requirements used to minimize health and safety risks to persons working on the OU 3-13, perched water project. The HASP meets the requirements of the OSHA Standard, 29 CFR 1910.120, 29 CFR 1926.65, "Hazardous Waste Operations and Emergency Response." The document's preparation is consistent with information found in the following references:

- National Institute of Occupational Safety and Health (NIOSH)/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH 1985)

- Company manuals.

The HASP complies with the authorized safety basis detailed in INTEC's authorized safety basis and "Other Industrial" classification per the applicable preliminary hazard assessment, auditable safety analysis, or safety analysis report, if applicable.

The HASP governs all work support of the OU 3-13 that is performed by the INEEL personnel and INEEL subcontractors, or employees of other companies. Persons not normally assigned to work at the site, such as representatives of DOE, DOE-ID, the State of Idaho, OSHA, and EPA are considered occasional workers as stated in OSHA 29 CFR 1910.120 and 29 CFR 1926.65.

Prior to sending this document to the EPA and the Idaho Department of Health and Welfare, the HASP will be reviewed and revised by the HSO in conjunction and the FTL to ensure the effectiveness and suitability of this HASP.

11. DOCUMENT MANAGEMENT

This section summarizes document management and sample control. Documentation includes field logbooks used to record field data and sampling procedures, CoC forms, and sample container labels. The analytical results from this field investigation will be documented in reports and used as input for refining the current conditions for the computer model.

11.1 Documentation

The FTL will be responsible for controlling and maintaining all field documents and records, and for verifying that all required documents to be submitted to INEEL SAM are maintained in good condition. All entries will be made in indelible black ink. Errors will be corrected by drawing a single line through the error and entering the correct information. All corrections will be initialed and dated.

11.1.1 Sample Container Labels

Waterproof, gummed labels generated from the SAP database will display information such as the unique sample identification number, the name of the project, sample location, and analysis type. Labels will be completed and placed on the containers in the field before collecting the sample. Sample team members will provide information necessary for label completion. Such information may include sample date, time, preservative used, field measurements of hazards, and the sampler's initials.

11.1.2 Field Guidance Form

Field guidance forms verifying unique sample numbers provided for each sample location can be generated from the SAP database. These forms contain the following information:

- Media
- Sample identification numbers
- Sample location
- Aliquot identification
- Analysis type
- Container size and type
- Sample preservation.

11.1.3 Field Logbooks

Field logbooks will be used to record information necessary to interpret the analytical data in accordance with INEEL SAM format and controlled and managed according to applicable company policies and procedures.

11.1.3.1 Field Team Leader's Daily Logbook. A project logbook maintained by the FTL will contain a daily summary of the following:

- All field team activities necessary to reconstruct the events and methods used to accomplish the objectives of this FSP
- Visitor log (a site visitor logbook may be assigned to record this information)
- List of site contacts
- Problems encountered
- Any corrective actions taken as a result of field audits.

This logbook will be signed and dated at the end of each day's sampling activities

11.1.3.2 Sample Logbooks. Sample logbooks will be used by the sample team(s). Each sample logbook will contain information such as the following:

- Physical measurements
- All QC samples
- Sample information (i.e., sample location, sample collection information, analyses requested for each sample, sample matrix)
- Shipping information (i.e., collection dates, shipping dates, cooler identification number, destination, CoC number, name of shipper).

17.7.3.3 Field Instrument Calibration/Standardization Logbook. A logbook containing records of calibration data will be maintained for each piece of equipment requiring periodic calibration or standardization. This logbook will contain logsheets to record the date, time, method of calibration, and instrument identification number.

11.1.4 Photographs

It is not anticipated that formal photographic records of the activities under this FSP will be made. Photographs may be taken by field personnel to record general equipment set-ups and installation procedures. A minimum of two copies will be made of any photographs taken during this project. One copy will be placed in the project file. The second copy will accompany other project documents (i.e., field logbooks) to be placed in the Document Control and Records Management files.

11.2 Document Revision Requests

Revisions to this, or any referenced document, will follow applicable company policies and procedures. Final changes must also be approved through the supervising Agencies since this is a primary FFA/CO document.

12. REFERENCES

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Appendix A

Sampling and Analysis Tables

Appendix A
Sampling and Analysis Tables

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

09/08/2003 10:25 AM

Sample Description					Planned Date	Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
										AT1	AT2	A13	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT1	T20
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	A1	3A	9A	AN	CO	RB	R8													
SWG000	REG	WATER	GRAB		911512003	INTEC	WATER SUPPLY	TBD	NA	1	1		1	1															
SWG001	REG	WATER	GRAB		911512003	INTEC	SEWAGE LAGOONS	TBD	NA	1	1		1	1															
SWG002	REG	WATER	GRAB		9/15/2003	INTEC	FIRE/RAW WATER	TBD	NA	1	1	1	1	1															
SWG003	REG	WATER	GRAB		911512003	INTEC	PERCHED WATER	55-06	NA	1	1	1	1	1	1	1													
SWG004	REG	VJATER	GRAB		9/15/2003	INTEC	PERCHED WATER	MW-5	NA	1	1	1	1	1	1	1													
SWG005	REG	WATER	GRAB		911512003	INTEC	PERCHED WATER	MW-2	NA	1	1	1	1	1	1	1													
SWG006	REG	WATER	GRAB		9/15/2003	INTEC	PERCHED WATER	MW-20-2	NA	1	1		1	1	1	1													
SWG007	REG	WATER	GRAB		911512003	INTEC	PERCHED WATER	MW-10-2	NA	1	1		1	1	1	1													
SWG008	REG	WATER	GRAB		911512003	INTEC	PERCHED WATER	37-4	NA	1	1	1	1	1	1	1													
SWG009	REG	WATER	GRAB		9/15/2003	INTEC	PERCHED WATER	MW-24	NA	1	1	1	1	1	1	1													
SWG010	REG	WATER	GRAB		9/15/2003	INTEC	PERCHED WATER	MW-1-4	NA	1	1	1	1	1	1	1													
SWG011	REG	WATER	GRAB		9/15/2003	INTEC	PERCHED WATER	USGS-50	NA	1	1	1	1	1	1	1													
SWG012	REG	WATER	GRAB		911512003	INTEC	PERCHED WATER	332	NA	1	1		1	1	1	1													
SWG013	REG	WATER	GRAB		9/15/2003	INTEC	PERCHED WATER	333	NA	1	1		1	1	1	1													
SWG014	REG	WATER	GRAB		911511003	INTEC	PERCHED WATER	33-4	NA	1	1		1	1	1	1													

me sampling activity displayed on this table represents the first 6 m 9 characters of me sample identification number The complete sample identification number will appear on the sample labels

AT1
AT2 Analysis Suite #1
AT3 Analysis Suite #2
AT4
AT5 CLP Metals - Filtered
AT6
AT7
AT8
AT9
AT10

AT11
AT12
AT13
AT14
AT15
AT16
AT17
AT18
AT19
AT20

Comments:
Anions = Chloride. sulfate fluande, bromide. nitrate
CLP Metals Filtered - CLP TAL and boron
Analysis Suite #2 shall be filtered in Le field through a 0 45 micron filter

Analysis Suites
Analysis Suite #1: Hydrogen Isotope Ratio (Water), Oxygen Isotope Ratio (Water)
Analysis Suite #2: Nitrogen in Nitrate Isotopic Ratio, Oxygen in Nitrate Isotopic Ratio

Contingencies

Samplingand Analysis Pian Tablefor Chemical and RadiologicalAnalysis

OS10812003 10 25 AM

Plan Table Number GROUP4-SEPT03

SAP Number DOE/ID-11100

Sampler Millward, A. L

Date 0910812003 Plan Table Revision 4 0 Project WAG 3 GROUP 4 SOURCE WATER AND GEOCHEMICAL SAMPLING 9103 Project Manager FORSYTHE, H S

SMO Contact KIRCHNER D R

Sample Description						Sample Location			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)
SWG015	QC	WATER	FBLK		9/15/2003	INTEC	FIELD BLANK	QC	NA
SWG016	QC	WATER	RNST		9/15/2003	INTEC	EQUIP RINSATE	QC	NA

Sampling Activity	Enter Analysis Types (AT) and Quantity Requested																			
	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
	A1	3A	9A	AN	C0	RB	R8													
SWG015					1	1	1													
SWG016	1			1	1	1	1													

The sampling activity displayed on this table represents the first 6 io 9 characters of the sample identification number

The complete sample identification number will appear on the sample labels

AT1	Alkalinity	AT11	
AT2	Analysis Suite #1	AT12	
AT3	Analysis Suite #2	AT13	
AT4	Anions	AT14:	
AT5	CLP Metals Filtered	AT15:	
AT6	Si-90	AT16	
AT7	Tritium	AT17:	
AT8:		AT18	
AT9		AT19:	
AT10		AT20	

Comments

Anions = chloride, sulfate, fluande. bromide, nitrate

CLP Metals Filtered. CLP TAL and boron

Analysis Suite #2 shall be filtered in the field through a 0 45 micron filter

Analysis Suites

Contingencies

Analysis Suite #1 Hydrogen Isotope Ratio (Water), Oxygen isotope Rabo (Water)

Analysis Suite #2 Nitrogen in Nitrate Isotopic Ratio, Oxygen in Nitrate Isotopic Rabo

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number GROUP4-NOV03

SAP Number

Date 06/17/2003 Plan Table Revision 0 0 Project: WAG 3 GROUP 4 SOURCE WATER AND GEOCHEMICAL SAMPLING 1113 Project Manager FORSYTHE, H S SMO Contact KIRCHNER, D R

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1 A1	AT2 AN	AT3 C0	AT4 WN	AT5 YA	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
SWG050	REG	WATER	GRAB		11/03	INTEC	WATER SUPPLY			1	1	1	1	1															
SWG051	REG	WATER	GRAB		11/03	INTEC	SEWAGE LABOONS			1	1	1	1	1															
SWG052	REG	WATER	GRAB		11/03	INTEC	FIRE/RAW WATER			1	1	1	1	1															
SWG053	REG	WATER	GRAB		11/03	INTEC	STEAM CONDENSAT			1	1	1	1	1															

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels

AT1

AT2

AT3 CLP Metals - Filtered

AT4 Hydrogen Isotope Ratio (Water)

AT5: Oxygen Isotope Ratio (Water)

AT6

AT7:

AT8

AT9

AT10

AT11

AT12:

AT13

AT14:

AT15:

AT16

AT17:

AT18

AT19

AT20

Comments

Anions = chionde, sulfate, fluoride, bromide, nitrate

CLP Metals Filtered= CLP TAL and boron

Analysis Suites:

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number GROUP4 FEB04

SAP Number

Dale 09/08/2003 Plan Table Revision 2 0 Project WAG 3 GROUP 4 SOURCE WATER AND GEOCHEMICAL SAMPLING 2/04 Project Manager FORSYTHE H S SMO Contact KIRCHNER 0 R

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
										AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
Sampling Activity	Sample Type	Sample Matrix	Call Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	A1	3A	9A	AN	C0															
SWG100	REG	WATER	GRAB		0204	INTEC	WATER SUPPLY			1	1		1	1															
SWG101	REG	WATER	GRAB		02/04	INTEC	SEWAGE LAGOONS			1	1		1	1															
SWG102	REG	WATER	GRAB		02/04	INTEC	FIRE/RAW WATER			1	1		1	1															
SWG103	REG	WATER	GRAB		02/04	INTEC	STEAM CONOENSAT			1	1		1	1															
SWG104	REG	WATER	GRAB		0204	INTEC	STEAMCONDENSAT			1	1		1	1															
SWG105	REG	WATER	GRAB		02/04	INTEC	PONDEO WATER			1	1		1	1															
SWG106	REG	WATER	GRAB		02104	INTEC	PONDEO WATER			1	1		1	1															
SWG107	REG	WATER	GRAB		02/04	INTEC	PONDED WATER			1	1		1	1															
SWG108	REG	WATER	GRAB		02/04	INTEC	SNOW				1																		
SWG109	REG	WATER	GRAB		02/04	INTEC	SNOW				1																		
SWG110	REG	WATER	GRAB			INTEC	SNOW				1																		
SWG111	REG	WATER	GRAB		0204	INTEC	PERCHED WATER	55-06		1	1	1	1	1															
SWG112	REG	WATER	GRAB		0204	INTEC	PERCHED WATER	MW-5		1	1	1	1	1															
SWG113	REG	WATER	GRAB		02104	INTEC	PERCHED WATER	MW-2		1	1	1	1	1															
SWG114	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	MW-20-2		1	1	1	1	1															

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels

AT4 Anions

AT5 CLP Metals - Filtered

AT6

AT7

AT8

AT9

AT10

AT14:

AT15:

AT16:

AT17:

AT18:

AT19

AT20

This SAP Table supplements the annual sampling scheduled lor Feb-March 2004

Tritium and Sr-90 will be analyzed as part of the annual sampling

Analysis Suite #2 shall be filtered in the field through a 0.45 micron filter.

Analysis Suites

Contingencies:

Analysis Suite #1: Hydrogen Isotope Ratio (Water), Oxygen Isotope Rabo (Water)

Analysis Suite #2 Nitrogen in Nitrate Isotopic Rabo. Oxygen in Nitrate Isotopic Rabo

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: GROUP4-FEB04

SAP Number:

Date: 09/08/2003 | Plan Table Revision: 2.0 | Project: WAG 3 GROUP 4 SOURCE WATER AND GEOCHEMICAL SAMPLING 2/04 | Project Manager: FORSYTHE, H. S. | SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										A1	3A	9A	AN	C0															
SWG115	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	MW-10-2		1	1	1	1	1															
SWG116	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	37-4		1	1	1	1	1															
SWG117	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	MW-24		1	1	1	1	1															
SWG118	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	MW-1-4		1	1	1	1	1															
SWG119	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	USGS-50		1	1	1	1	1															
SWG120	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	33-2		1	1	1	1	1															
SWG121	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	33-3		1	1	1	1	1															
SWG122	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	33-4		1	1	1	1	1															
SWG123	REG	WATER	GRAB		02/04	INTEC	SRPA	USGS-121				1																	
SWG124	REG	WATER	GRAB		02/04	INTEC	SRPA	USGS-47				1																	
SWG125	REG	WATER	GRAB		02/04	INTEC	SRPA	USGS-112				1																	
SWG126	REG	WATER	GRAB		02/04	INTEC	SRPA	USGS-77				1																	
SWG127	REG	WATER	GRAB		02/04	INTEC	SRPA	USGS-123				1																	
SWG128	REG	WATER	GRAB		02/04	INTEC	SRPA	USGS-52				1																	
SWG129	REG	WATER	GRAB		02/04	INTEC	SRPA	ICPP-MON-A-230				1																	

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Alkalinity
AT2: Analysis Suite #1
AT3: Analysis Suite #2
AT4: Anions
AT5: CLP Metals - Filtered
AT6:
AT7:
AT8:
AT9:
AT10:
AT11:
AT12:
AT13:
AT14:
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:
Anions = chloride, sulfate, fluoride, bromide, nitrate
CLP Metals Filtered = CLP TAL and boron
This SAP Table supplements the annual sampling scheduled for Feb-March 2004
Tritium and Sr-90 will be analyzed as part of the annual sampling.
Analysis Suite #2 shall be filtered in the field through a 0.45 micron filter.

Analysis Suites:
Analysis Suite #1: Hydrogen Isotope Ratio (Water), Oxygen Isotope Ratio (Water)
Analysis Suite #2: Nitrogen in Nitrate Isotopic Ratio, Oxygen in Nitrate Isotopic Ratio

Contingencies:

Plan Table Number GROUP4-FEB04

SAP Number

Date 090812003 Plan Table Revision: 2 0 Project: WAG 3 GROUP 4 SOURCEWATER AND GEOCHEMICALSAMPLING2/04 Project Manager: FORSYTHE. H. S SMO Contact: KIRCHNER. D R

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
										AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	A1	3A	9A	AN	C0															
SWG130	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	CS-CH				1																	
SWG131	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	STL-DP				1																	
SWG132	REG	WATER	GRAB		02/04	INTEC	PERCHED WATER	MW-4-2				1																	

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1 Alkalinity
A12 Analysis Suite #1
AT3 Analysis Suite #2
AT4 Anions
AT5 CLP Metals Filtered
AT6
AT7
AT8
AT9
AT10
AT11
A112
AT13
AT14:
AT15
AT16
AT17
AI18
AT19:
AT20:

Comments

Anions = chloride, sulfate, fluoride, bromide, nitrate

CLP Metals Filtered = CLP TAL and boron

This SAP Table supplements the annual sampling Scheduled for Feb-March 2004

Tritium and Sr-90 will be analyzed as part of the annual sampling

Analysis Suite #2 shall be filtered in the field through a 0.45 micron filter

Analysis Suites

Analysis Suite #1: Hydrogen Isotope Ratio (Water), Oxygen Isotope Ratio (Water)

Analysis Suite #2: Nitrogen in Nitrate Isotopic Ratio, Oxygen in Nitrate Isotopic Ratic

Contingencies:

?
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Samplingand Analysis Plan Table for Chemicaland Radiological Analysis

Plan Table Number GROUP4-JUL04

SAP Number

Date 06/19/2003 Plan Table Revision: 0 0 Project: WAG 3 GROUP 4 SOURCE WATER AND GEOCHEMICAL SAMPLING 7104 Project Manager FORSMHE. H S SMO Contact: KIRCHNER, D R

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										A1	AN	CO	WN	YA	RB	R8													
SWG150	REG	WATER	GRAB		0 7 M	INTEC	WATER SUPPLY			1	1	1	1	1															
SWG151	REG	WATER	GRAB		07/04	IMEC	SEWAGE LAGOONS			1	1	1	1	1															
SWG152	REG	WATER	GRAB		07104	INTEC	FIRE/RAW WATER			1	1	1	1	1															
SWG153	REG	WATER	GRAB		0 7 M	INTEC	BLR #1			1	1	1	1	1															
SWG154	REG	WATER	GRAB		07104	INTEC	BLR #2			1	1	1	1	1															
SWG155	REG	WATER	GRAB		07/04	INTEC	BLR #3			1	1	1	1	1															
SWG156	REG	WATER	GRAB		07104	INTEC		5506		1	1	1	1	1	1	1													
SWG157	REG	WATER	GRAB		07/04	INTEC		MW 5		1	1	1	1	1	1	1													
SWG158	REG	WATER	GRAB		07/04	INTEC		MW-2		1	1	1	1	1	1	1													
SWG159	REG	WATER	GRAB		07/04	INTEC		MW 20		1	1	1	1	1	1	1													
SWG160	REG	WATER	GRAB		07/04	INTEC		MW 10		1	1	1	1	1	1	1													
SWG161	REG	WATER	GRAB		07/04	INTEC		37 4		1	1	1	1	1	1	1													
SWG162	REG	WATER	GRAB		07/04	INTEC		MW 4		1	1	1	1	1	1	1													
SWG163	KEG	WATER	GRAB		07104	INTEC		MW 24		1	1	1	1	1	1	1													
SWG164	REG	WATER	GRAB		07104	INTEC		MW-1		1	1	1	1	1	1	1													

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number

The complete sample identification number will appear on lhe Sample labels

AT1 Alkalinity

AT2 Anions

AT3 CLP Metals - Filtered

AT4 Hydrogen Isotope Ratio (Water)

AT5 Oxygen Isotope Ratio (Water)

AT5 si-90

AT7 Tritium

AT8

AT9

AT10

AT11

AT12

AT13:

AT14

AT15

AT16

AT17

AT18

AT19

AT20

Comments:

Anions = chloride sulfate, fluoride, bromide, nitrate

CLP Metals Filtered = CLP TAL and boron

Analysis Suites

Contingencies

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: GROUP4-JUL04

SAP Number:

Date: 06/19/2003 Plan Table Revision: 0.0 Project: WAG 3 GROUP 4 SOURCE WATER AND GEOCHEMICAL SAMPLING 7/04 Project Manager: FORSYTHE, H. S. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
										AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	A1	AN	C0	WN	YA	RB	R8													
SWG165	REG	WATER	GRAB		07/04	INTEC		USGS-50		1	1	1	1	1	1	1													
SWG166	REG	WATER	GRAB		07/04	INTEC		STL-DP		1	1	1	1	1	1	1													
SWG167	REG	WATER	GRAB		07/04	INTEC		BLR-DP		1	1	1	1	1	1	1													
SWG168	REG	WATER	GRAB		07/04	INTEC		BLR-CH		1	1	1	1	1	1	1													
SWG169	REG	WATER	GRAB		07/04	INTEC		BLR-AL		1	1	1	1	1	1	1													
SWG170	REG	WATER	GRAB		07/04	INTEC		33-2		1	1	1	1	1	1	1													
SWG171	REG	WATER	GRAB		07/04	INTEC		33-3		1	1	1	1	1	1	1													
SWG172	REG	WATER	GRAB		07/04	INTEC		33-4		1	1	1	1	1	1	1													

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Alkalinity
AT2: Anions
AT3: CLP Metals - Filtered
AT4: Hydrogen Isotope Ratio (Water)
AT5: Oxygen Isotope Ratio (Water)
AT6: Sr-90
AT7: Tritium
AT8:
AT9:
AT10:

AT11:
AT12:
AT13:
AT14:
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:
Anions = chloride sulfate, fluoride, bromide, nitrate
CLP Metals Filtered = CLP TAL and boron

Analysis Suites:

Contingencies:

Samplingand Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number GROUP4-OCT04

SAP Number

Date 0611912003 Plan **TaMe** Revision: 0.0 **Project** WAG 3 GROUP **4** SOURCE WATER AND GEOCHEMICAL SAMPLING10/04 Project Manager: FORSYTHE, H S SMO Contact: KIRCHNER, D R.

Sample Description					Planned Date	Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
										AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method		Area	Type of Location	Location	Depth (ft)	AI	AN	CO	WN	YA	R8	R8													
SWG200	REG	WATER	GRAB		10/04	INTEC	BLR #1			1 1 1 1 1 1 1 1 1 1 1																			
SWG201	REG	WATER	GRAB		10/04	INTEC	BLR #2			1	1	1	1	1															
SWG202	REG	WATER	GRAB		10104	INTEC	BLR #3			1	1	1	1	1															
SWG203	REG	WATER	GRAB		10104	INTEC	PERCHED WATER	55-06		1	1	1	1	1	1	1													
SWG204	REG	WATER	GRAB		10104	INTEC	PERCHEDWATER	MW-5		1	1	1	1	1	1	1													
SWG205	REG	WATER	GRAB		10/04	INTEC	PERCHEDWATER	MW-2		1	1	1	1	1	1	1													
SWG206	REG	WATER	GRAB		10/04	INTEC	PERCHED WATER	MW-20-2		1	1	1	1	1	1	1													
SWG207	KEG	WATER	GRAB		10104	INTEC	PERCHED WATER	MW-10-2		1	1	1	1	1	1	1													
SWG208	REG	WATER	GRAB		10/04	INTEC	PERCHED WATER	37-4		1	1	1	1	1	1	1													
SWG209	REG	WATER	GRAB		10/04	INTEC	PERCHED WATER	MW-24		1	1	1	1	1	1	1													
SWG210	REG	WATER	GRAB		10/04	INTEC	PERCHEDWATER	MW-1-4		1	1	1	1	1	1	1													
SWG211	REG	WATER	GRAB		10/04	INTEC	PERCHEDWATER	USGS-50		1	1	1	1	1	1	1													
SWG212	REG	WATER	GRAB		10/04	INTEC	PERCHED WATER	33-2		1	1	1	1	1	1	1													
SWG213	REG	WATER	GRAB		10/04	INTEC	PERCHED WATER	33-3		I	1	1	1	1	1	1													
										1	1	1	1	1	1	1													

The sampling activity **displayed on this table represents** the first **6** to 9 **characters of the sample identification** number

The **complete sample identification** number will **appear** on **the sample labels**

AT1 Alkalinity

AT2 Anions

AT3 CLP Metals - Filtered

AT4 **Hydrogen** Isotope Ratio (Water)

AT5 Oxygen **Isotope** Ratio **(Water)**

AT6 Sr-90

AT7 Tritium

AT8

AT9

AT10

AT11

AT12

AT13

AT14

AT15

AT16

AT17

AT18

AT19

AT20:

Comments:

Anions = chloride, sulfate, fluoride, bromide, **nitrate**

CLP **Metals** - Filtered = CLP TAL **and boron**

Analysis Suites

Contingencies

A-11